RAILROAD GAZETTE

FRIDAY, AUGUST 25, 1899.

CONTENTS.

ILLUSTRATIONS:	PAGE
New Consolidation Engine of the Delaware, Lackawanna & Western	592
Heavy Ten-Wheel Freight Locomotive for the Union Pacific	593
Scales for Weighing Locomotives	594
The Automatic Rail Joint Spring	596
Some Devices at the Meadow Shops of the Pennsylvania Railroad	596
CONTRIBUTIONS:	
Canda's 100,000-lb. Car	591
New Railroad Building in Columbia	591
Telephones for Train Despatching	591
EDITORIALS:	
Is the Passenger Train Shed a Mistake?	598
Railroad Legislation of the Year	598
A Few Railroad Statistics	598
Annual Report—Southern Railway, Brooklyn Rapid Transit	599
EDITORIAL NOTES	598, 599
New Publications	600
Trade Catalogues	600

GENERAL NEWS:	PAGE
Locomotive Building	601
Car Building	601
Bridge Building	601
Meetings and Announcements	602
Personal	602
Elections and Appointments	603
Railroad Construction	603
General Railroad News	604
Traffic	604
MISCELLANEOUS:	
Technical	600
The Scrap Heap	601
International Association for Testing Materials	591
The St. Louis Club Question Box	592
Central Association of Railroad Officers; July Meeting	593
Society for the Promotion of Engineering Education	595
The Stratford Trolley Car Disaster	596
English Railroad Earnings in 1898	597
The Manchester Ship Canal	597
Air Brake Inspection on the N. C. & St. L.	600
The Railroad Testing Laboratory	600

Contributions.

Canda's 100,000 Lb. Car.

New York, Aug. 16, 1899.

To the Editor of the Railroad Gazette:

In your issue of August 11 there appears an article signed "Another S. M. P.," having reference to the 50-ton capacity box cars of the Southern Pacific Company, questioning the cubic capacity of the cars for certain commodities.

It has not been claimed that this car would hold 100,000 lbs. of baled hay, or similar freight; but it does carry, owing to its increased size, from 10,000 to 12,000 lbs. more cotton than the ordinary 60,000-lb. capacity box car, and weighs no more than the average of such cars. The Southern Pacific car was designed with sufficient cubic capacity to carry 100,000 lbs. of sugar or wheat in sacks, which it will do. These articles are not handled in bulk on that road.

F. E. CANDA.

New Railroad Building in Colombia.

Medellin, Colombia, S. A., June 10, 1899.

To the Editor of the Railroad Gazette:

In the near future the Antioquia Railroad will open an extension of 28 km. (17.4 miles) to the new station to be called Providencia, and there seems to be much satisfaction among the merchants and people generally at the prospect of soon having this road within reasonable distance of this city, where all merchandise is transported on mule-back, and the expense is enormous, costing $72 to $100 per ton for transportation alone from the terminus of the road now 135 km. (83.9 miles) distant from this city. The road is being built by the government of the Department of Antioquia by direct administration, and seems to be very well built and at minimum cost, and appears satisfactory to the masses of the people and the merchants.

A contract was recently made for the grading of a short extension on up the Nus River valley toward the divide at a point known as "Le Quiebra," and over which the engineers have located a common adhesion line of 3% grades, also rack-rail lines of 8%, 8 km. long and another line with 17% grades 3 km. long. It is understood that all of the engineering difficulties have been overcome, and the question is reduced to one of simple economy. Strange to say, there are some persons of intelligence here who insist that the government should build a rack-road, notwithstanding the expense will be almost as much as that of the simple adhesion line, and will place the rack almost in the middle of the road of 200 km. in length. The engineers are almost a unit against the introduction of the rack, but it is thought that the pressure of public opinion will force the government to adopt it because shorter and more speedily built. It is known that the chief engineer has collected a great mass of data on rack-roads and will present an exhaustive report on this part of the line and then leave it to the government to solve the economic problem as they see fit.

The old road from Puerto Berrio to Pavas has been entirely rebuilt, all of the old wooden bridges having been replaced by steel structures of high specification, furnished by the Phoenix Iron Co. of Philadelphia. All of the new construction is of a very high class and equal to any in any other part of the world. The road is under the direction of a "Junta Directiva" in Medellin, of which Mr. Fabricano Botero of this city, a graduate of the Troy Polytechnic is Gerente (Manager), and the actual construction and physical management of the road is under the direction of Mr. F. F. Whittekin, of Tionesta, Pa., who, as Chief Engineer, has brought the road up from a most miserable wreck to a really good narrow gage road, equal to any of its kind in the States or Europe. He has established an organization on the road that is indeed creditable, alike, to the government and himself, and has caused him to be regarded as the ablest railroad man ever coming to Antioquia or Colombia.

The shops at Puerto Berrio have been enlarged and all kinds of repairs are made there, and some new work turned out that is a great advance over any other shop in the Republic. Mr. Ribon, a native mechanic, is in charge of this department. The traffic has been increasing very much during the past two years and exports now exceed imports, and the prospect is indeed bright for the future of the road and Department.

G. M. SMITH.

Telephones for Train Despatching.

Chicago, Aug. 12, 1899.

To the Editor of the Railroad Gazette:

I have read with interest the article of Mr. Blodgett in your issue of July 28, page 536. As I have previously had much pleasure and profit in reading Mr. Blodgett's articles, I took up this one with hopeful expectations, but, if you and he will pardon the frankness, I will say that I think he is, in the present case, a little out of line.

Mr. Blodgett says that superintendents hesitate to use the telephone in place of the telegraph, because the latter can make a record; but how can he reconcile this view with the fact that the telegraph, as used on our railroads, never does make a record? Practically all operators read by sound, and if one makes a mistake there is no more proof of how the mistake was made and which person made it than there would be in the case of a telephone message. Again, Mr. Blodgett says that the 'phone is as superior to the telegraph as the latter is to a messenger. This surely must be somewhat hyperbolical. The telegraph saves from 10 minutes to 10 hours over a messenger; and the teleghone, at best, could not save more than from one to five minutes on a message, unless we sacrifice the written record.

Going into details, Mr. Blodgett proposes the use of a book at each station in which to record train orders; but wherein is this better than the present plan of loose sheets, to be filed away? The only advantage of a book is to keep orders in neat shape and to preserve them from loss; but there is not the slightest complaint on this score with the present methods; and a book has the disadvantage of unwieldliness and of keeping different orders in one place when you want them in different places.

Why should a conductor repeat a message to the dispatcher in person? If a message has been once repeated, that, according to all past experience, is enough. Mr. Blodgett's proposition is a beautiful ideal, but in actual practice we cannot afford to thus extend our safeguards. The standard code requires the signature of the superior conductor "when practicable;" but no one thinks of trying to make this rule compulsory. Either the trains would have to be delayed or else the despatcher would have to have the miraculous foresight to be able to send orders an hour in advance.

There is no doubt that the telephone would save some time, and I am not arguing against its use; but Mr. Blodgett magnifies the problem. In repeating a message after it has once been written out, by the station operator, the telephone would save an appreciable amount of time, as he could communicate 200 words a minute as against 25 or 30 by telegraph. Some little time might also be saved in what we may call preliminary negotiations, by getting conductors into the office to be spoken to direct by the despatcher. These improvements are well worth considering, but beyond this, what have we to gain?

It is said that attendants at offices could be secured for less wages; and it is true that in case of the necessity arising for a sudden change of operator at an office, there would be a larger number of competent persons to select from. But it seems to me that the wages of telegraph operators are already about as low as we can expect to make them and secure persons of the necessary general intelligence to do the important work of receiving, delivering and recording train orders and managing the train order signal. In other words, the general qualification of a station man are as important as the special qualification of ability to send and read Morse characters; so that if the telegraph were to be abandoned to-day, it would still be necessary to continue to pay as high wages as at present, unless we were willing to put up with a lower degree of intelligence and moral character.

I think you will find that most despatchers of experience will agree with me in the foregoing views It is true that there are train-order offices where telephone operators are now employed, there being no telegraph communication with such offices. But that Managers and Superintendents will be willing to make this practice the rule at all their offices, I am unwilling to believe.

Possibly the universal introduction of the telephone might enable us to use printed forms for some orders, so that fewer words would have to be transmitted over the wire, but this could only be decided by trial. The main point I would make is that to insure the necessary safety in the handling of train orders, under the present American despatching system, every order must be put in writing; and, the average penman being able to write no faster than the average Morse telegraph operator, there is no advantage in sending messages any faster than they are sent now.

M. F. J.

International Association for Testing Materials.

The second annual meeting of the American Section of the International Association for Testing Materials was held in Pittsburgh, Pa., Aug. 15 and 16. The meeting was called to order at 10:30 a. m. by President Mansfield Merriman, in the hall of the Engineers' Society of Western Pennsylvania, thirty members and a number of guests being present. About 45 members reported before the close of the session. Among those present were the Carnegie Steel Co., represented by Jno. McLeod, Engineer of Tests; the Bethlehem Steel Co., represented by Maunsel White, Engineer of Tests, and H. F. J. Porter; the Illinois Steel Co., represented by P. E. Harhart; the Cambria Steel Co., represented by Geo. Thackray; the Pencoyd Iron & Steel Co., represented by Jas. Christie; the Monongahela Iron & Steel Co., represented by R. A. Carter; the Carbon Steel Co.; represented by R. W. Anderson; the Coatesville Iron Co., represented by C. L. Huston; American Society of Mechanical Engineers, represented by Gus. C. Henning; Technicker Verein, New York, represented by P. A. Lange; Technicker Verein, Pittsburgh, represented by W. H. Schotter; American Foundryman's Association, represented by Dr. R. G. G. Moldenke; Railroad Gazette, represented by Gus. C. Henning; Prof. A. N. Talbot, C. E., University of Illinois, Urbana, Ill.; Prof. W. K. Hatt, Purdue University, Lafayette, Ind.; Prof. J. M. Porter, Lafayette College, Easton, Pa.; Prof. Fessenden, Western University, Allegheny, Pa.; Prof. Edgar Marburg, University of Pennsylvania, Philadelphia, Pa.; R. L. Humphrey, Secretary, Engineer of Tests, City of Philadelphia; W. R. Webster, Inspecting Engineer, Philadelphia, Pa.; Frank C. Osborn, Inspecting Engineer, Cleveland, O.; P Kreuzpointner, Testing Laboratory, P. RR., Altoona, Pa.; Max J. Wichhorst, Engineer of Tests, C., B. & Q. RR.; E. A. Kincaid, Engineer of Tests, C. & N. W. Ry.; Thos. D. West, Sharpsville, Pa.; F. I. Rice, Assistant Engineer, Keystone Bridge Works, Pittsburgh, Pa.

After presentation of the Secretary's and Treasurer's reports the members of the International Council, Mr. Gus. C. Henning, presented his report, detailing what had been done abroad, and letters relating to the invitation to and participation in the World's Fair Congress to be held at Paris in 1900. As the substance of this is of interest to all engineering associations, an abstract is here given.

After the International Association had been twice invited on behalf of the French Government to hold its congress at Paris in 1900, and such invitation had been accepted definitely at the Stockholm Congress in 1897, it developed at a Council meeting held in Paris in May last that such invitation was to be ignored. The original statutes governing the Engineering Congresses of 1900 issued by the French Government, and transmitted to the Council many months previously, stated that such organizations as were in the habit of holding International Congresses should also arrange their own Congress for Paris. Without any reason or explanation, or any previous announcement to that effect, the Council at its May meeting in Paris was informed that the proposed Congress could not be held in 1900, and it was clearly stated that if this should occur nevertheless, neither reduced railroad and exposition tickets, nor recognition or courtesies of any kind, would be offered or extended by the French Government. It was merely stated that a French Commission had been appointed by the Government which would take charge absolutely of the proposed Congress on Testing Materials. The previous invitations and profuse promise of hospitable reception tendered at Stockholm were entirely ignored, in spite of the fact that the French members had voted at that time, with all other members, to postpone the definite adoption of statutes and election of officers to the proposed Paris Congress in 1900. It must be remembered that the World's Congress Organization Committee is composed of all of the French members of the International Association. All of these facts were submitted and after a protracted discussion, the following resolution was unanimously adopted by the American Section, viz.:

"That it is the sense of the American Section that any invitation of the International Association for Testing Materials tendered by the French Government should be accepted only upon compliance with the conditions stated in a resolution of the International Council, which are: 'That the International Association will have localities at their disposal in order to hold a general session to discuss its own affairs.'

"This resolution shall not, however, prohibit any

member from accepting any invitation offered to him personally."

This resolution will be transmitted to the Council, for proper consideration at future meetings, as well as the suggestion that a meeting be held in Brussels or some other convenient city, should satisfactory arrangements fail. It must be here pointed out that all of the authorities and the best-known experts in testing materials of all countries are members of the International Association, and that the latter has never held anything but International Congresses. A special World's Fair Congress under the management of a few of its members does, therefore, seem unnecessary, in fact an absurdity, apparently proposed for the special benefit of a few individuals.

The question of publishing transactions and reports of committees was taken up, and the fact emphasized that the money retained by the American Section from the membership dues, amounting to $1 per member, is barely sufficient for postage, programmes and necessary notices. It was not deemed advisable to increase the annual dues, and the fact was pointed out that was not obtained by vote of members, but solely by the voluntary declaration of individuals and the recommendation of two members. Art. 5 of the statutes, being different from any clause in those of all other engineering associations, may be here repeated. It is: "Every member, upon admission, assumes the obligation to advance the interests of the Association to the best of his abilities." Therefore it was pointed out that under this clause the funds necessary for publication should be assessed, according to the abilities of the members. As any member may withdraw at any time, this can work no hardship.

A number of propositions were made to have papers printed free of cost, when Mr. R. A. Carter, President of the Monongahela Steel & Iron Co., arose and presented one hundred dollars for this object. Prof. Jas. M. Porter also offered one hundred dollars. This prompt generosity aroused great enthusiasm, which was intensified when all of the representatives of the great steel works, the Carnegie, Illinois and the Cambria Steel Companies, arose and stated that their companies expected to derive great benefits from the work of the American Section of the Association and had voluntarily assumed their share of the obligations; hence all that was necessary was that the Executive Committee assess each of them for the amount necessary, and the money would be paid promptly.

Prof. Mansfield Merriman, President, delivered the address which we printed last week.

The technical part of the meeting was begun by a paper by Prof. W. K. Hatt: "Comparison of Steel Plates under Flexure and Tension."

In this paper, which we present in abstract, it was pointed out by many duplicate tests that the tenacity and location of proportional limit and yield point were not the same when determined from tension and transverse tests. The fact was also pointed out that in a certain size of steel plate 12 in x 1¾ in., the P-limit and Y-points were unusually low, in fact only about 17,000 and 25,000 lbs. per sq. in., from repeated tests, while all other properties were apparently normal. The paper called forth a protracted and heated discussion by Messrs. Christie, Webster, White, Kreuzpointner, Henning, Talbot and Hatt.

Some, especially the steel works representatives, questioned the accuracy of such low results, while those who are in the habit of making accurate tests, using micrometers and autographic recorders or other reliable auxiliaries, all confirmed the figures given in the paper. In fact, one gentleman stated it to be his opinion that the P-limit and Y-point had been located too low because "the measuring instrument had slipped," failing to see that slipping of the instrument was synonymous with failure to indicate stretch, this only indicating stretch (the instant of yielding) long after it had actually occurred. To indicate yielding prematurely the instrument should have advanced (stretched) more rapidly than the test piece.

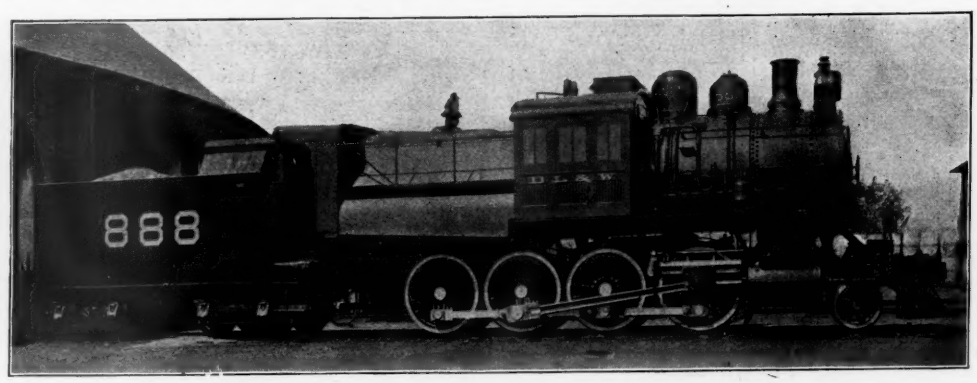
The Association has before it the study and development of twenty-one problems, to which the American Section has added four more. The first of the latter, "On the present state of knowledge of impact tests," is in the hands of Profs. Hatt, of Purdue, and Marburg, of the University of Pennsylvania. The former handed in a voluminous paper going over the bibliography of the subject, but as it is not complete it cannot be presented now. It did, however, call forth some discussions, and more particularly inquiries about the European practice, which has demonstrated the practicability of impact test in a remarkable degree.

The preliminary report of the American members of the International Committee, No. 1, "on Standard Specifications of Testing Iron and Steel," was presented by Mr. William R. Webster, Chairman of the American Sub-Committee. He reported progress and promised to report at the next annual meeting, which it was proposed to hold in May of next year. Mr. Max J. Wickhorst, Engineer of Tests of the C., B. & Q. RR., made a preliminary report on problem No. 5, "Collection of data for establishing standard rules for piece tests, with special reference to axles, tires, springs, pipes, etc." He reported that the manufacturers and railroad managers had courteously answered his inquiries, but that there had been no time to digest the information obtained.

None of the other committees were present to report. The American Section was received with great hospitality by many of the largest manufacturers in the Pittsburgh district, and two afternoons were devoted to visiting many places of interest, such as the Carnegie Works, Carbon Steel Co., Cement Works, Westinghouse Electric Manufacturing Co., and the Westinghouse Machine Co., and many others.

New Consolidation Engine of the Delaware, Lackawanna & Western.

The engraving shows a consolidation engine lately built at the Scranton shops of the Delaware, Lackawanna & Western. The engine is designed to burn buckwheat anthracite, according to the standard practice of the Delaware, Lackawanna & Western.



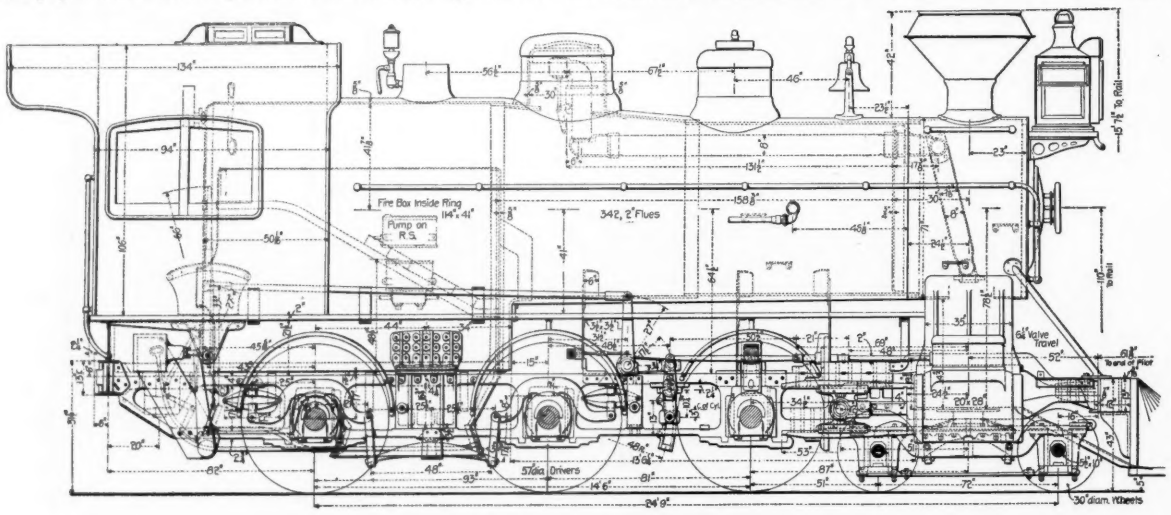
Consolidation Locomotive—Delaware, Lackawanna & Western Railroad.

The weights and important dimensions are given in the table below:

Cylinders	22 in. dia. 30 in. stroke
Steam ports	1½ in. x 20 in.
Exhaust "	3 in. x 20 in.
Diameter of boiler at smallest course	74 in.
Firebox, inside	10 ft. 6 in. long 9 ft. wide inside
Tubes, number	413
" diameter	2 in.
" length	13 ft.
Weight of engine (working order)	197,650 lbs.
" on drivers	175,500 lbs.
" " truck	22,150 lbs.
" of tender loaded	101,000 lbs.
Heating surface of tubes	2,791 sq. ft.
" " firebox	211 sq. ft.
" " total	3,002 sq. ft.
Grate area	95 sq. ft.
Working pressure	200 lbs. to sq. in.
Capacity of tank	5,000 gals.
Tender frame	Steel channel
Maximum tractive force	43,496 lbs.
Diameter of driving wheels	57 in.
Size of driving journals	9 in. dia. 11½ in. wide
" " main crank pin	6½ in. and 6¾ in. dia.; 4 in. and 6½ in. long
Rigid wheel base	15 ft. 6 in.
Total " "	23 ft. 11½ in.
" " " engine and tender	50 ft. 7 in.
Pony truck journals	6 in. dia. 10 in. long
" " wheels	31 in. dia. steel tires
Tender truck wheels, type	Boies
" " " diameter	33 in.
" " journals	5 in. x 9 in. M. C. B. standard

Special Fittings.

Gould automatic couplers, front and back.
Main rod steel channel type, 10 ft. 7 in. long.
Two No. 11 Monitor injectors.
Two 3 in. Ashton safety valves.
Lubricator, Nathan type.
Star headlight.
Utica steam gages.
Brake, Westinghouse-American type.
Latrobe tires.
Marden tender brake beams.
Journals, "Magnus" metal.
Springs, National Railway Spring Co.
Valves, Allen-Richardson type, ⅞ in. lap.
Jerome's metallic packing.



Ten-Wheel Freight Locomotive—Union Pacific

Carbon boiler steel.
Snow's bell ringer.
Leach's sanding device.
Keasbey & Mattison's magnesia boiler covering.
Main driving wheel centers cast steel, made by Pratt & Letchworth.

The St. Louis Club Question Box.

A week or two ago we mentioned the fact that the St. Louis Railway Club has put into use a question box. This was introduced at the March meeting of the Club, and has been taken in hand seriously under the directions of a special committee. The committee has received a number of questions for answer and discussion in the columns of the printed Proceedings and at the regular meetings of the Club. Forty of these questions follow below. Correspondence concerning them should be addresseed to the Question Box Committee, St. Louis Railway Club, St. Louis, Mo.

Motive Power Department.

No. 1. Does the temperature of the atmosphere have any appreciable effect on the amount of coal consumed by locomotives? If it does, what is the approximate per cent. of increase in coal required in same service in zero weather over the amount necessary when thermometer stands 70 degrees above zero?

No. 2. To what extent are you using a solid lubricant in locomotive lubrication, and with what success?

No. 3. What is the best method of handling freight trains partly equipped with air?

No. 4. The use of soda ash in locomotive boilers?

No. 5. What type of engine-truck brass do you use? If filled, what is the design of the filling? What is the composition of the filling? About what mileage do your brasses give? Do you have any trouble on account of hot boxes?

No. 6. Should not the question of fuel economy receive more attention from railroad men, not alone in the way of urging enginemen to render more careful service, but in the care taken of draft appliances, valves, cylinder packing, flues, fuel inspection, etc.?

No. 7. Would not draft pipes in locomotive extension fronts affect an engine in two ways—first, permit a larger exhaust nozzle, with better results from the exhaust action on the fire; second, decrease cylinder back pressure?

No. 8. What is the proper method of arriving at the "number of locomotives in service," as shown on locomotive performance sheets?

Car Construction and Inspection.

No. 9. Cause and prevention of worn wheel flanges?

No. 10. Does applying brakes on wheels that have hot journals increase the liability of journal breaking or twisting off?

No. 11. M. C. B. Rule 3, Section 12: What reason is there for not including the inside of flange as well as the outside?

No. 12. M. C. B. Rule 5, Section 17: Why is the replacing of a spring plank in the truck of a refrigerator car set at $2, and the door post $1.20?

No. 13. As to draft rigging, which is preferred, the American continuous, with 1½ in. turn-buckle in center for taking up slack of the continuous rods, or the draw-bar with yoke that pulls the car by the front end?

No. 14. Why do not Master Car Builders increase strength of draft-key in continuous draw-bars?

No. 15. Which is preferable, refined wrought iron, or the grade of soft steel that is now being used in car building?

No. 16. What kind of roof would you recommend for refrigerator cars, and what kind of paper for insulation?

No. 17. What is the best coating to prevent the effect of salt water on the iron of refrigerator cars?

No. 18. Is the present general method of constructing 40-ton capacity coal cars, with side boards outside of side stakes, the only practicable method, and how will the maintenance compare with 30-ton cars as ordinarily constructed?

No. 19. Limit of wear to M. C. B. coupler body, knuckle, worn lock, pivot or pin, defective lock-and-guard arm spring, that owners should be responsible for in case of removal; necessity demands this on account of trains parting?

No. 20. Would it not be for the best interest of railroad companies to have Joint Inspectors Associations throughout the country frame their rules so that they will not conflict with M. C. B. Association rules?

No. 21. Have the modern M. C. B. rules, which have been in force for past three years, been beneficial in the quicker movement of freight cars? Has the expense for maintenance increased in proportion to quicker movement, if any? Have the modern rules reduced inspection and clerical expenses? Are the present rules just to all railroads?

Traffic Department.

No. 22. The best method of getting maximum tonnage in house or merchandise cars, especially at points where companies have more than one receiving or delivery house?

No. 23. Has the average loading per car increased in the same ratio as the capacity of the car has increased in the past fifteen years?

No. 24. What should be the proper ratio of dead weight to paying freight per train?

Track Construction.

No. 25. The relation of track to traffic?

No. 26. Recent progress in improved designs of rails and fastenings?

No. 27. Tonnage of steel rails in track in United States?

No. 28. Average life of steel rails, and does life vary with weight?

No. 29. Disposition and condition of rails when displaced?

No. 30. What influence will the gradual extinction of oak have upon track construction?

No. 31. Where spiral or easement curves are used at ends of regular curves, where should the elevation of the outer rail begin?

Miscellaneous.

No. 32. Views on electric block signaling? The correct signal, whether it be a normal clear or a normal danger signal?

No. 33. What is the best organization for the average length railroad running out of St. Louis, Mo.—list of offices, duties attached to each set?

No. 34. What can be done to reduce expenses of switching, especially at large terminals, of cars, by initials? Also handling empty cars of same size and capacity over same ground in opposite directions, account of initials?

No. 35. At a recent discussion at the Western Railway Club, a thorough and complete dusting of cars was advocated; compressed air used for cleaning purposes. Is this not contrary to sanitary science as so well set forth in Prof. Johnson's very excellent paper on the above subject printed in the St. Louis Railway Club Proceedings for February?

No. 36. The Brown system of discipline without punishment: What are its advantages, if any, over the system of punishment by suspension?

No. 37. Is profit sharing on railroads practical? If so, how can it best be adapted?

No. 38. Cannot the railroads, by concerted action, correct the "tramp nuisance?"

Mechanical Department.

No. 39. Can shafting and machinery in locomotive and car shops be driven by electricity with greater economy than by steam, without considering first cost of plant in either case?

No. 40. What is the comparative cost of electric and steam power plants for machine shops, taking into consideration the shafting, belting and hangers required?

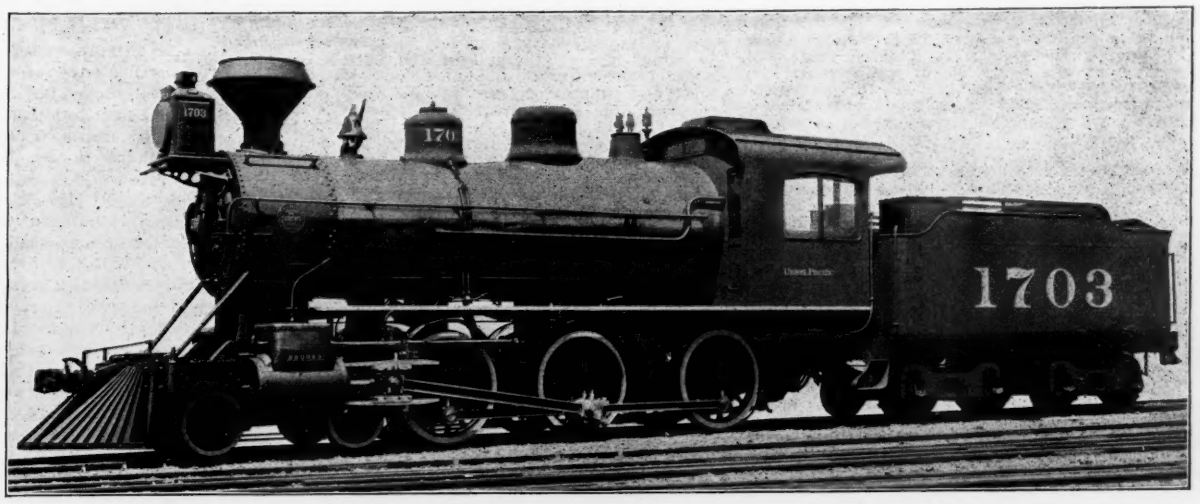
Note.—Questions 39 and 40 relate to railroad shops having facilities for keeping in repair (not building) 75 engines, 75 passenger cars and 3,000 freight cars annually. It is suggested that two motors be figured on for the machine shop and two for the car shop, to be belted to main lines only of shafting.

Heavy Ten-Wheel Freight Locomotives for the Union Pacific.

The forty ten-wheel freight locomotives for the Union Pacific, now building at the Brooks Locomotive Works, are of more than ordinary interest because of their great size. They are almost as heavy as the ten-wheel, two-cylinder compounds, described in our issue of May 14, 1897, now running on the Northern Pacific, which are the heaviest locomotives of this type. But so far as tractive effort is concerned, the Northern Pacific locomotives are not so powerful as those shown by the accompanying engravings. The Northern Pacific engines have cylinders 22 and 34 in.x26 in., 63-in. driving wheels, and are built for a working steam pressure of 200 lbs.; the weight on the driving wheels is 126,000 lbs., and the total weight 172,500 lbs. The Union Pacific locomotives have cylinders 20x28 in., 57-in. driving wheels, 134,000 lbs. on the drivers, a total weight of 170,000 lbs., and are designed to carry 200 lbs. steam pressure. Also the boilers of the Union Pacific locomotives have very nearly the same amount of heating surface as the Northern Pacific. It is probably safe to say that the new Union Pacific engines are the most powerful ten-wheelers built up to this time.

It will be seen that the boiler is of the extended wagon top type, with the fire box placed above the frames, while at the rear end the boiler is carried on a heavy cast steel expansion pad. The crown sheet is supported by crown bars and a brick arch on water tubes is used. The front end is short, and in accordance with the usual practice of the road, a diamond stack is used with the netting in the top. Attention is called to the size of the journals of the driving axles, which are 9x12 in.

Of the special equipment used the following may be mentioned: American driver brakes, New York tender brakes, Nathan lubricators and injectors, Ashton safety valves, A. French springs and Jerome metallic packing. The principal dimensions are as follows:

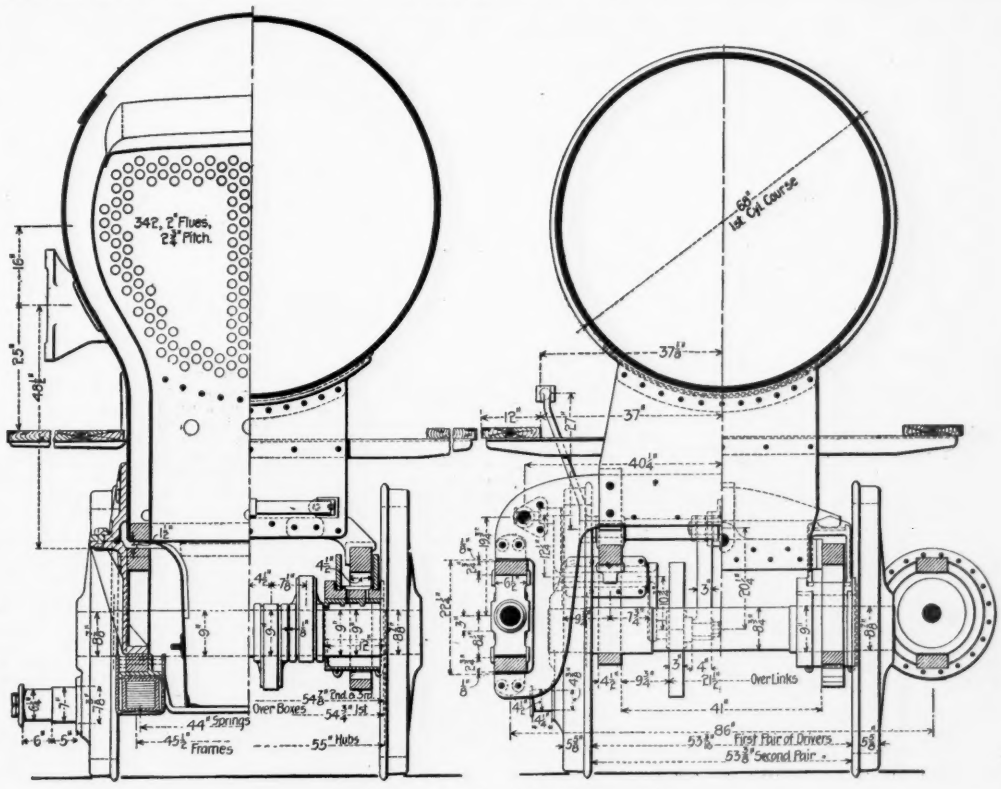


Ten-Wheel Freight Locomotive for the Union Pacific—Brooks Locomotive Works.

Gage	4 ft. 8½ in.
Fuel	Bituminous coal
Weight on drivers	134,000 lbs.
" " truck wheels	36,000 lbs.
" total	170,000 lbs.
" tender, loaded	110,000 lbs.
Wheel base, total, of engine	24 ft. 9 in.
" " driving	14 ft. 6 in.
" " total (engine and tender)	52 ft. 4½ in.
Length over all, engine	38 ft. 6⅝ in.
" " " total, engine and tender	62 ft. 9⅞ in.
Height, center of boiler above rails	9 ft. 2 in.
" of stack, " "	15 ft. 7½ in.
Heating surface, firebox	231 sq. ft.
" " tubes	2,343 sq. ft.
" " total	2,574 sq. ft.
Grate area	31.3 sq. ft.
Drivers, diameter	57 in.
material of centers	Cast steel
Truck wheels, diameter	30 in.
Journals, driving axle, size	9 x 12 in.
" truck " "	5½ x 10 in.
Main crank pin, size	6¼ x 6 in.
Cylinders, diameter	20 in.
Piston stroke	28 in.
" rod, diameter	4 in.
Kind of piston rod packing	Metallic
Main rod, length center to center	9 ft. 9 n.
Boiler, thickness of material in barrel	¾ in.
" diameter of barrel	68 in.
Seams, kind of horizontal	Sextuple riveted
" " " circumferential	Double riveted
Thickness of tube sheets.....Back, ⅝ in.....Front,	¾ in.
" " crown sheet	⅜ in.
Crown sheet stayed with	Crown bars
Dome, diameter	30 in.
Firebox, length	9 ft. 6 in.
" width	3 ft. 5 in.
" depth front	79 in.
" " back	79 in.
" material	Steel
" thickness of side and back sheets	⅜ in.
Firebox, brick arch	yes, on water tubes
" water space, width:	front, 4 in.; sides, 4 in.; back, 4 in.
Grate, kind of	Cast iron rocking
Tubes, number	342
" material	Charcoal iron
" outside diameter	2 in.
" length over sheets	13 ft. 2⅜ in.
Smokebox, diameter	71 in.
" length	53 in.
Exhaust nozzle	Double
" "	Permanent
" " diameter	3⅛ in.
" " distance of tip below center of boiler	27½ in.
Netting	Wire, in top of stack
" size of mesh	3 x 4 in.
Stack	Diamond
" diameter	16¼ in.
" height above smokebox	3 ft. 6 in.

Tender.

Type	Eight-wheel, wood frame
Tank capacity for water	5,000 gals.
Coal capacity	12 tons
Kind of material in tank	Steel
Thickness of tank sheets	¼ in. and ¼ in.
Type of under-frame	Oak
Diameter of truck wheels	33 in.
" and length of axle journals	5 x 9 in.
Distance between centers of journals	5 ft. 3 in.
Diameter of wheel fit on axle	6⅜ in.
" of center of axle	5⅜ in.
Length of tender frame over bumpers	23 ft. 0 in.
" " tank	20 ft. 0 in.



Sections Brooks Ten-Wheel Locomotive.

Steam ports, length	18½ in.
" " width	1⅝ in.
Exhaust ports, length	18½ in.
" " width	2¾ in.
Bridge, width	1⅝ in.
Valves, kind of	Allen-Richardson
" greatest travel	6¼ in.
" outside lap	1⅛ in.
" inside lap or clearance	0 in.
" lead in full gear, negative	1/16 in.
Boiler, type of	Extended wagon top
" working steam pressure	200 lbs.
" material in barrel	Steel
Width of tank	9 ft. 10 in.
Height of tank, not including collar	4 ft. 8 in.
Type of back drawhead	Buckeye coupler

Central Association of Railroad Officers; July Meeting.

The summer meeting of this Association, comprising all divisions, was held at St. Louis, July 18 and 19. Papers read at this time by Mr. Murphy were reported in the Railroad Gazette of July 28. The

first principal item of business to come before the meeting was the report of a special committee on the M. C. B. coupler. This committee consisted of Wm. Garstang, I. G. Rawn and J. M. Lindley. Extracts follow:

The shanks of couplers to-day, when made of the best materials, will stand any demands made on them at that point by the heaviest equipment, and have a breaking strain far in excess of the combined power of any three or four locomotives ever built. There is a possibility yet of making the thickness of the material in these shanks heavier and better to stand any increasing demands. For instance, the shank of an M. C. B. coupler made of steel and one inch thick will have a breaking strain of more than 1,000,000 pounds, which is a force that can never be exerted in fair usage. It is, therefore, no more than fair to the design and size of that part of the coupler to say it can always be made to meet the requirements under fair usage, which is something that cannot be said about any other part of the car.

There can be no fair criticism advanced against its practicability to couple automatically under all reasonable conditions and to remain coupled unless defective, either from wear or the locking pin not performing its duty. But there is some question regarding the shape of the inner or wearing side of the knuckle being of the best design to prevent wear, or, rather, to confine the wear to the hook shape.

The coupler, as made to-day, without changing any of the important lines, is from 15 to 25 per cent. heavier and stronger than when first made for cars of lighter capacity, and there is abundant possibility to still increase its weight and strength by the adoption and betterment of material.

The statement has been made that the M. C. B. coupler did not give a center line of draft, and that the concussion when coming together was not on central lines. While this would appear to be the case while looking at a single coupler, it is not the case when two couplers are pulled or bunted together. Hook two couplers and suspend them from one end (this report only refers to couplers made strictly to M. C. B. lines), then suspend a plumb line by them; the line will prove the couplers to maintain a straight line from end to end of shank.

It has again been contended that the couplers were not flexible. With regard to that matter, it has been recognized by the larger part of our railroad management that one of the great features of the M. C. B. coupler was to eliminate the slack in the train and to prevent, to considerable extent, the swaying of cars from side to side while running on a straight track, which is injurious to the cars as well as dangerous to the operators who have to pass over them. Probably no one feature contributed more largely to the favorable adoption of the hook coupler than the results obtained by the close and spring coupling discovered at the Burlington brake test and subsequent trials made specially for this purpose.

Since it has been abundantly proven that a locomotive will start and haul as many cars with the close couplings as with the slack link, and haul the train without the shock, making it possible to use air brakes on our freight trains, we think the foresight in the adopting of a coupler eliminating this part of the flexibility of the old drawhead the most commendable, and had any device containing this feature been adopted we would now be ready to discard it.

If couplers do not couple it is because of defects in their manufacture, and not in the lines adopted by the M. C. B. Association. In all the tests made for years the question of coupling was raised and tested, and it was found that the M. C. B. coupler coupled readily on curves up to 20 degrees. There are some couplers made without any regard for the location of the hinge for the knuckle that will not do this.

When it is remembered that our cars have increased from 50,000 to 100,000 pounds capacity and our engines from 150,000 to 200,000 pounds in weight, and that all our present cars have stronger draft rigging, stronger couplers and adequate buffer blocks for their protection, but that we do not separate these cars in our trains, but couple them, probably, to a car of ten years ago, with lighter draft rigging, light couplers and no buffer blocks, we must expect failures, not in the new cars, but in the old ones, and we find on careful inquiry that that is where the failures do, to a large extent, occur.

The result of the researches and opinions of this Committee is that the M. C. B. coupler, as adopted, is the best device for the purpose that has been presented to the railroad companies from any source; that the coupler made strictly on the contour lines adopted will couple under all ordinary conditions; that it admits of being strengthened to meet the requirements of heavier service: that a line of pulling and buffing is as central as any coupler of its same length: that it is able to stand the shocks of switching when protected by buffers; that the coupler admits of the successful running of long trains of heavy cars and the use of air brakes on such trains; that the saving in repairs by its use amounts to something like $1.50 per car per year: that the present cost of links and pins will more than double the cost of repairs to couplers, and that it is as strong and long-lived as other parts of the car.

Now, in conclusion, we wish to emphasize the fact that this report is based on that class of couplers that embody good workmanship and material, and is in no way a defense for some couplers in the market that have been used by various railroads for other reasons than their mechanical worth. That couplers of this description would prove failures has been fully predicted. On the other hand, there are couplers costing but very little more than can be relied upon to give satisfaction, and the purchaser can get good couplers by paying for them.

Mr. Pulaski Leeds, of the Louisville & Nashville, being unable to be present, sent a letter criticising the M. C. B. coupler. Extracts follow:

There are many curves to-day where few, if any, vertical plane couplers will couple, and the link and pin has to be used; on the other hand, we were all of us at that time putting forth every effort to reduce the variation in height to a minimum, and to-day have it where an automatic link and pin will couple.

The head of the vertical plane has a limiting point at the pivotal point, and this cannot be increased beyond about the degree given by your Committee, viz.: 175,000 to 200,000 pounds, and in order to get this the bar has to be made of the very best steel known. Your Committee says that they do not think this necessary, and the fact that this is quite generally endorsed explains why, while contending for the best workmanship and material, couplers which will stand the common average of from 125,000 to 130,000 pounds not only unlock and become inoperative, but actually break in ordinary every-day service, and still receive endorsement as fulfilling all requirements. In many cases this condition has obtained because so many roads have felt pecuniarily obliged to equip their cars as cheaply as possible to comply with the law, and this practice will undoubtedly be followed by such investigation of actual comparative ecenomy that within a few years the result will be not only the survival of the fittest, but, I hope, the demand for the 175,000-pound bar, as, in my opinion, when at its best it is none too good; at the same time, while having greater first cost, such a bar will ultimately prove most economical. As an example, I will state that some years ago we equipped ninety cars with ten cars each of nine different makes of couplers. These cars were all of one class and in the same service, used in the same trains and on the same division. We employed a man for about one year whose business it was to investigate any defect or breakage, so that a fair comparison should be made. At about the same time we had a number of couplers cast from our own pattern and applied to the same class of cars and in the same service; to-day the local officials of that division report that of the couplers on the ninety cars there are none in existence, while of those from our own pattern 90 per cent. are not only in existence, but operative, and that there have not been any of the main parts renewed on account of breakage. These couplers cost us about 20 per cent. in excess of the market price for first class couplers at that time (or of the nine others), but in my opinion there can be but little question of their economy.

I do not believe it would be good policy to revert to the link and pin, or, at least, not until such a one shall be devised as would clearly demonstrate its superiority over the vertical plane, as this would in a great degree bring us back to the chaotic condition that formerly existed.

In my opinion a committee could more profitably employ themselves in making recommendations on the increase of efficiency, durability and safety, and as pointers will say the present construction is such as to necessitate too nice adjustment of unlocking rods and chains, and not enough allowance for natural wear. All locks should pass the unlocking point to such an extent that a slight bending of the lift rod or the wear of chain would not prevent their unlocking, and should also have clearance enough so as to never ride the chain when carry irons get slack; in other words, when the lift rod is on the holding ledge there should be a clearance above and below the lock, and the lift rod should extend entirely across and be operated from either side of the car. Next, in nearly all, if not all, the present locks the bearing against the tail of the knuckle is not only of so restricted an area that it soon wears, but it wears into a wedging shape, or incline, that tends to unlock them by forcing the lock up. In my opinion not only should the lock find a full bearing across the tail of the knuckle, but should be made with an incline that would hook under, that is, largest at the bottom; and further, this lock should also bear against the wall of the coupler. To achieve all this would necessitate the locking block riding the tail of the knuckle, but as Titus and Bossinger described this in patents that have long ago expired, the only conflict with any present existing patents would be one of construction, and an efficient lock of this kind could be easily designed. A lock set or a coupler which could be uncoupled without opening the knuckle and left in position to couple without either holding it up by either hand or ledge or resetting after once uncoupled is a greatly desired article.

As a postcript to the foregoing I will say that, if any of you gentlemen take enough interest in the matter to take the trouble, I am told you can, by visiting the laboratory of the National Malleable Iron Co., of Cleveland, see a graphic illustration of the internal and infernal strains our equipment is subjected to by this method of coupling that will be a revelation to almost anyone. Of course, their coupler does not show up as bad as others, but it is their show.

Mr. Carney: I think the ground has been pretty well covered. There is one thing that I might mention in connection with this subject that we have been doing on the St. Louis Division of our line, which we find works very satisfactorily; that is, we have been oiling the inside of the knuckle with a very cheap grade of grease. When a car comes on the repair track for any repairs whatever we have a man swab the coupler of the car with this grease, and we make it a practice to go over all our passenger equipment.

A report was received from a special committee on Train Registers, which recommended the use of a form containing 14 columns, as indicated by the underscored words in the following specimen entry:

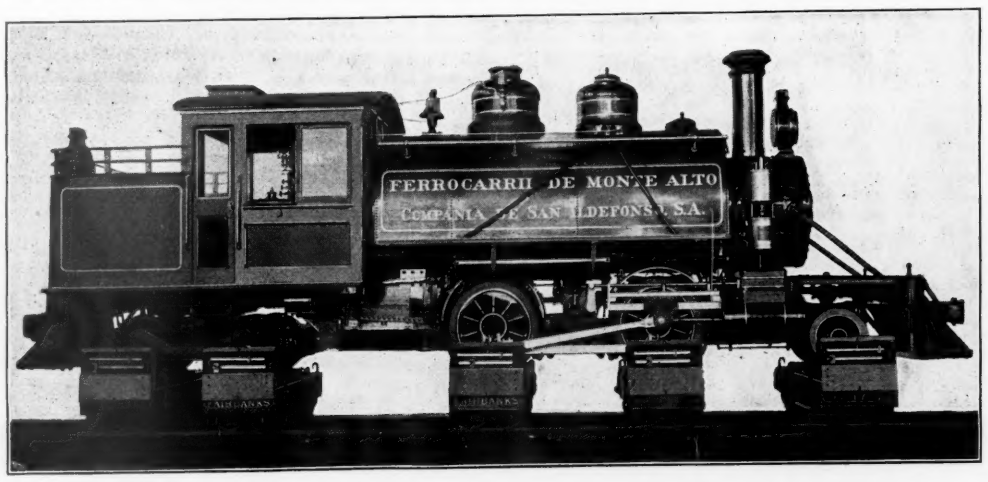
August 14, 1st No. 86, engine 121, signals red from Toledo to Cleveland. French conductor, English engineman. Arrived 1.11 p. m., departed 1.13 p. m.

The committee was headed by Mr. T. F. Whittelsey, the inventor of a glass-front case for containing a register and keeping it clean, but the only recommendation in the report in line with this improvement is that train registers have "special protection," either by cabinet or otherwise, and that each day's registration be removed as soon as practicable and filed away.

A special committee, of which C. E. Carson of Kansas City was Chairman, made a report on "service certificates," recommending a form for adoption as standard. This form has blank spaces for a physical description of the employee for whom the certificate is issued and a place for his autograph. The whole is to be copied in a tissue book before being issued.

Mr. W. S. Glover of the Chicago, Burlington & Quincy, presented a paper on the maintenance and operation of a railroad telegraph department, an abstract of which will appear in the Railroad Gazette.

A committee on signal lights, C. S. Rhoads, Chairman, made a report commenting favorably on the use of yellow lights in distant signals. No definite recommendations are made concerning colors; and drawings are given showing the arrangement of lights, three to each signal arm, as used on the Boston & Albany for giving an indication at night by position or shape instead of color. The committee recommends the use of large lenses in lamps for night signals. A glass 5⅝ in. in diameter can be seen many rods further than one 1¾ in. in diameter. Attention is called to the fact that well-made, durable lamps are much more common in England than in this country. As a result of the discussion of this report, a committee, with Mr. Rhoads as Chairman, was appointed to make another report next year.



Scales for Weighing Locomotives—Baldwin Locomotive Works.

Mr. J. W. Starr, Superintendent of Terminals of the Atchison, at Kansas City, read a paper on the use of telephones at terminals. He gave various instances, showing how valuable time can be saved by quick communication. The time of a switching engine, worth $2.50 an hour, can often be greatly economized in a large city if the yardmaster is able to communicate with the conductor when he is out picking up cars. The local freight agent should be relieved by furnishing telephones on the desks of his cashier and switching clerk. A private exchange is needed in a large terminal, and should be located near the local freight agent's office. Telephones should be provided for the assistant yardmasters, the yard clerks and at other places, as local conditions require. At Kansas City one of the large lines has put in a private exchange, which costs for installation and maintenance for one year, including the salary of the operator at the private exchange ($1.10 a day), $1,314. The average cost per day is $3.60, which includes all necessary connections with the city exchange. This cost is about equal to the salary of seven messenger boys at $15 each, monthly, and the electrical communication is worth more than three times seven boys.

Mr. W. B. Throop of the Chicago, Burlington & Quincy, read a paper on discipline, in which he said that he found that his acquaintances who were using the Brown system always modified it more or less by introducing their own ideas. Mr. Throop believes that every case requiring discipline should be thoroughly investigated and that the Superintendent should be fully acquainted with each employee, but beyond this he is afraid to prescribe any rules and he doubts whether a rigid numerical record of good and bad deeds can be made a just measure of discipline.

Scales for Weighing Locomotives.

The Baldwin Locomotive Works have adopted a rather novel method of measuring the weights on locomotive wheels which is illustrated by the accompanying engraving, wherein the weight on each

pair of wheels is measured by a separate scale. These scales are portable, being mounted on small truck wheels which bear on the track rails, and each scale is capable of registering a weight of 60,000 lbs. They are about 7 ft. 6 in. long by 2 ft. 6 in. wide, and are so made as to avoid all detachable parts, this applying even to the scale weights. The locomotive to be weighed is raised by a traveling crane and after a scale has been placed beneath each pair of wheels it is lowered into the position shown by the engraving. It is the practice of the Baldwin Works to weigh all locomotives with a full tank and three gages of water in the boiler.

Society for the Promotion of Engineering Education

The annual meeting of the Society for the Promotion of Engineering Education at Columbus, last week, brought together about 60 teachers from all parts of the country.

Officers Elected.

The following officers were elected for the ensuing year: President, Ira O. Baker, University of Illinois; Vice-Presidents, Robert Fletcher, Dartmouth College, and C. D. Marx, Leland Stanford, Junior, University; Treasurer, C. A. Waldo, Purdue University; Secretary, Edgar Marburg, University of Pennsylvania.

The following were elected members of the Council for three years: Brown Ayers, Tulane University; G. W. Bissel, Iowa State University; J. J. Flather, University of Minnesota; W. T. Magruder, Ohio State University; F. W. McNair, Michigan School of Mines; J. M. Porter, Lafayette College, and A. J. Wood, Railroad Gazette.

Thursday.

On Thursday morning Dr. William O. Thompson, the newly elected President of Ohio State University, welcomed the Society. This was followed by a report of the Secretary showing a membership of 237, with 20 new members elected at the meeting, making a total at the present time of 257.

Dr. Thomas C. Mendenhall, President of Worcester Polytechnic Institute, then read his retiring address as President of the Society. He dealt principally with the abuse of scientific and engineering information through the public press, and followed with a careful discussion advocating the universal adoption of the metric system in this country. The real object of his paper was in the nature of a plea for the betterment of our metrological system. The following are abstracts of the papers read at this session:

The Essentials of a Technical Education. By A. L. Rice.—The greater part of technical work, such as is done by foremen, superintendents and draftsmen, consists in adapting a means at hand to an end in view, and in this no new or untried design is called for, only new combinations and uses. For such work, the essential requisites are a knowledge of facts, details and methods and ability to think, to devise, to execute.

The knowledge of facts and details must come, largely, as a matter of experience. Teaching of methods and development of thinking ability are the proper lines of effort for a technical course. The work contemplated—the training to fit men for foremen and superintendents—may be done by short courses that are available for greater numbers than are the engineering courses. At present such positions are filled by men whose training has been that of the shop, which is one-sided, lacking the knowledge of underlying principles, or that of the engineering colleges, which is more extensive than is required.

In technical courses, the acquirement of facts and details during the course becomes desirable, and it must be combined with the thought training. The means to be adopted are the logical and mathematical derivation of the equations of physics and mechanics instead of the performance of examples merely for practice; the use of concrete examples and illustrations, drawn, so far as possible, from the daily surroundings of the shop and drawing room, in all science and mathematics teaching; the introduction of the thought element into all shop and laboratory work by placing the student, as rapidly as his experience will permit, on his own responsibility in the devising of means and methods for carrying on the work; the utilization, in advance work, of all knowledge gained, so as to drive it home and train the student to use what he learns; and the assignment, in drawing room, shop, laboratory and vacation work, of practical problems.

The Engineering Educational Value of a Refrigerating Plant. By Wm. T. Magruder.—The paper shows how commercial needs have demanded the practical applications of science, and that to-day, with our large refrigerating plants in all of our large cities, few scientific or exhaustive tests have been made; describes the boiler, engine, and 6-ton ammonia compressor and refrigerating plant in use in connection with the dairy laboratory of the College of Agriculture of the Ohio State University; and commends the use of such apparatus to the members of the Society.

Advanced Algebra in Engineering and Other College Courses. By F. L. Emory.—It is very generally acknowledged that mathematics is the backbone of engineering courses in universities and professional schools. Such being the case, it would seem logical that each part or vertebra should be designed for its special demands and follow one upon another in such a manner as to produce a symmetrical, strong and pliable structure. That such a structure exists in most courses is believed to be true, but there seems to be in some cases at least one joint that might be improved. The relative place of the subject of advanced algebra in universities where both general art students and technical students enter and continue in the same courses and classes, is the one to which reference is made.

The general art student studies the subject as a culture study, while the technical student pursues it as a training for future application. If it were left out of the course for the art student he would substitute the elements of trigonometry or geometry without much detriment. The same would apply to the technical student, except that the necessity of his having this branch covered before entering upon the applications to mechanics might be met by giving to such a student the usual advanced algebra course along with the calculus or supplementing the calculus and in connection with differential equations.

The question intended to be brought out in this discussion is: Would it not be better for the engineering student to have the courses in advanced algebra succeed those of calculus rather than to precede the solid geometry and trigonometry, and would not the general art student be rather benefited by such a transposition? It seems to me it would be an advantage to both.

This paper was discussed by Profs. Merriman, Hatt, Robinson and McNair. The discussion turned on the question of the position of higher algebra in the course as suggested by the paper. Prof. Merriman believed that higher algebra might come after a knowledge of the calculus was obtained and that some of the time now given to the calculus could be given to practical mechanical principles. He took exceptions to the statement of the author in effect that it was found necessary to supplement some of the mathematical courses by a course in advanced algebra, theory of equations and differential equations before starting the subjects of mechanics. The fundamental principles of mechanics and physics, said Prof. Merriman, can be mastered without mathematics, and the importance of obtaining a clear and accurate notion of the elementary principles should not be underestimated. Prof. McNair stated that there seemed to be a tendency to draw a sharp line between algebra and calculus, but the division was purely arbitrary.

At the afternoon session the first paper taken up was by Edgar Marburg, on "The Correspondence Schools in Technical Education." Prof. Marburg believed that the correspondence schools had filled a place not provided for in technical schools. The mechanics and day workers are the principal students in these secondary institutions. He raised the question with considerable emphasis as to whether or not these schools were permanent in their character and founded on a true and substantial basis. As a result of an examination of many catalogues of correspondence schools, he believed that the advertisements generally do not command the respect of the trained engineer. A few of the fittest are, however, worthy to succeed, but on the whole the courses in no wise compare with the ordinary courses in technical schools.

Discussion.—This subject was discussed at some length, the general trend of the remarks being that the correspondence schools had their place and had doubtless stimulated many young men who would otherwise not take up any study in engineering. It could not, however, be in any wise regarded as a substitute for the rigid courses in our engineering schools.

Prof. Merriman raised the question whether or not these correspondence schools promote engineering education. Formerly he believed that they would be the means of reaching those who would otherwise not get any engineering education, and they might be stimulated to go on with their work, but the financial success has brought others into the field and now they do not promote engineering education. Prof. Aldrich believed that the stand of the Society should be conservative on this matter. The real question at issue was: What credit should be allowed those coming from these schools? He pointed out a broad defect in the entire system of correspondence education in this country by means of a comparison between the German and the English method. In the former country they had gone at it with the idea of developing young men for foremen, directors or superintendents, and had succeeded fairly well, while in England the effort has been to lift the whole mass and the attempt has been a failure. Prof. Aldrich believed that we are taking the problem from an English point of view. Further, he stated that the correspondence schools give but one phase of true education in what they endeavor to give only an encyclopedic knowledge.

On the other side of the question it was suggested that a proper estimate of the values of these correspondence schools could be obtained by going to a town and seeing the effect on young men who were taking such courses. If the thought of those who are engaged in industrial pursuits, where vice is prevalent, is turned toward something better, there will be at least something done. A stranger present asked the privilege of saying a word, and told simply and effectively what a correspondence school had done for him. He stated in substance that before he took up the course he had men over him, but since pursuing a course he was his own boss. Prof. Allen believed that the Society would do well not to take any action of any kind in the investigation of the merits of these schools, even if they do deceive the public.

Friday.

The most carefully discussed paper of Friday was by C. Frank Allen, on "Methods of Teaching; by Text Book, by Lecture, by Laboratory, by Design and by Memoir." Prof. Allen discussed the topic with much clearness of the part that engineering schools should take in producing the engineer. His discussion was mainly on the methods of presentation rather than the substance of the matter taught. Experience, he said, must be obtained largely outside of the school. The engineering college has neither the time nor can it have the facilities for imparting experience to the extent and in the fashion in which it is necessary for the thoroughly successful practitioner in engineering. The material entering engineering colleges varies, but the graduates should have (1) a foundation training in theory applying to engineering which shall be at all events sound and effective as far as it goes and if possible extensive enough to meet all the reasonable demands in the future at the hands of those requiring the services of engineers; (2) sufficient familiarity to theory and practice to make the former of direct practical value. These two constitute a foundation or preparation sufficient to combine with experience in making an engineer. To these there should be added (3) sufficient experience or contact with the apparatus, processes and materials of engineering to assure the securing of positions when the necessary additional experience can be secured to supplement the training in theory already acquired; (4) some knowledge of principles, processes and methods in use in connection with engineering enterprises, so that breadth as well as knowledge of detals in that business may be easily acquired, and (5) a general liberality of education such as to allow a proper conception of the relations which any large enterprise connected with engineering bears to the political and social conditions existing in the world.

For theoretical training the text book is almost a necessity. Much of this is mathematical, nearly all is exact. Text books tend to exactness while the contrary is true of the lecture. In pure mathematics that an ambitious student with a good text book would progress with either a good or a very poor teacher. The text book, however, is insufficient in itself.

The design serves a different purpose. It is valuable in enforcing theory and in connecting theory and practice. The laboratory is useful primarily as a means of fixing and illustrating principles and is of incalculable importance as an aid to the teaching of theory and should be used as an indispensable aid to the other work of the school.

The memoir is substantially a form of laboratory work in which the library is the work room and books on engineering are the pieces of apparatus used and where a certain subject is assigned upon which the student shall make his report in writing.

Variety, however, is desirable partly to maintain the student's interest in his work and partly to develop him more fully and give him greater breadth. Furthermore, different subjects may best be treated in different ways, or the same subject under different conditions may demand treatment by a different method. For example, as a part of a course in civil engineering comprising many strong studies, railroad management and administration might best be so taught by lecture as to require little study, while for a course arranged especially to prepare young men for general railroad operating, its importance might demand work both by text book and by memoir and the combination of the two methods is first desirable. Subjects taught even by text book are often imperfectly appreciated until enforced by work in design or in the laboratory, and a variation in the amount of design work required by different students having the same amount of text book work will show its effect in the examination on the latter subject.

Discussion.—In commenting on this paper it was stated that the laboratory work is sometimes overdone. A laboratory course that requires simply the equivalent of pushing a button and having the instructor fix up the apparatus and the machine record the results, is vicious. No teacher should be tied to any one method, and a live teacher is better than any substitute method which can be suggested. Prof. Hatt stated that experience with graduates returning to the institute showed that theoretical work did the most for the students.

Prof. D. C. Jackson's written discussion of this paper will be printed in a later issue.

"Engineering Education and Expansion," by William S. Aldrich, led to the consideration of questions of some importance to not only engineering educators but also those interested in the broad question of the policy of expansion.

The question of the extent to which elective studies should be included in regular courses was discussed briefly by C. R. Jones. The paper was largely in the form of questions and was followed by a brief discussion. Prof. Robinson believed that there are

cases where it is of advantage and others where it is of a disadvantage to have elective studies. Election can hardly be possible before the senior year, and there should be a more general movement towards a common and satisfactory basis for electives in our engineering schools.

Saturday.

"The Desirability of Uniformity in the Use of Mathematical Symbols and Terms," by A. E. Haynes, was first taken up. Prof. Haynes points out the lack of uniformity and suggests a joint committee with the American Society for the Advancement of Science and the American Mathematical Society for the purpose of securing some basis of uniformity which shall be best adapted to all and worthy of general adoption. This suggestion, however, was not concurred in in the discussion, it being evident that the subject was too complicated to secure agreement.

"Drawing, Mathematical, Laboratory and Shop Work in Engineering Colleges," by H. E. Smith, presented by means of charts a graphical comparison of the amounts of time given to subjects named aside from recitations or lecture work in ten of the leading technical schools of the United States. This may be regarded as an important contribution and should, if carried out more extensively would form the basis of a very profitable study. These diagrams will be clearly printed in the proceedings of the Society, which will appear in a few months.

Other papers on which there was little important discussion were as follows: A Comparative Study of the Electrical Engineering Course as Given in Different Institutions. By F. C. Caldwell; An Apprentice System in College Shops. By O. P. Hood; On the Nature of Entropy. By Albert Kingsbury.

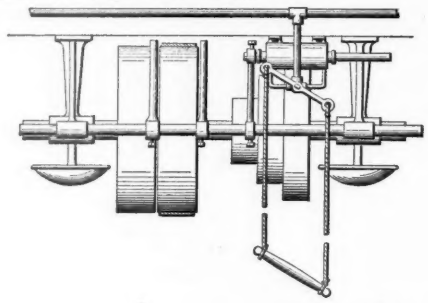
The Society was entertained on Friday evening by the Engineers' Club of Columbus at Minerva Park, about 10 miles from the center of the city. This park is under the control of the street railroad company, and is an excellent example of a successful method of built-up summer traffic by street railroads. The Society is indebted to the Ohio State University and to the many engineers at Columbus who extended the courtesies to the Society and made the time spent at Columbus so enjoyable.

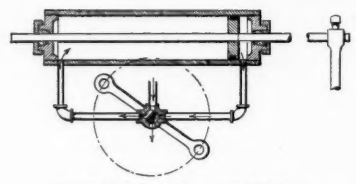
The Automatic Rail Joint Spring.

The old hand is skeptical of new kinds of nutlocks and therefore we have delayed a good while noticing the "automatic rail joint spring" which has now been made and sold for quite a number of months by the Rail Joint Spring Nut Co., of Chicago. The experience of those who have used it in track, however, seems to justify the expectations of the company.

A letter from Mr. Harahan, of the Illinois Central, says that these springs, which have been in service at Grand Crossing, in Chicago, for several months, "have remained tight, whereas heretofore we have not been able to keep the bolts tight in the crossing. So far these spring nuts have done substantially all that was claimed for them." These springs were put in Sept. 2, 1898, and Mr. Harahan's letter was written Jan. 20 last. The company said in February that the springs had remained in perfect order without being touched with a wrench, without breaking and without the renewal of a bolt. With ordinary nuts and washers bolts had to be tightened every morning and were frequently broken. There are said to be 600 movements a day over this crossing. The Roadmaster of the Lake Street Elevated, writing last February of his experience with the rail joint springs from Nov. 3, said that he had tried them in some particularly bad places where he had had trouble from loose and broken bolts. After a hundred days of service with these springs not a bolt had been broken; before that he used to have from 10 to 12 a week. He had not found one of these spring nuts loose and they had never been tightened since they were put on. The Roadmaster of the Chicago Terminal Transfer Co. had tried these spring nuts for three months at the Sixteenth street crossing, which is a very difficult place to maintain. He found that they held tight in every case and furthermore he got the unexpected result of no broken bolts. He says "the bolts on other crossings would pull in two, but with your nuts the bolts do not get loose or pull in two." A foreman of the Santa Fé put on some of these springs at West 38th street in Chicago. He said that he chose the hardest place he could find for the test and that nothing else ever stood there, but that with these spring nuts he had not had a broken bolt nor had he been obliged to tighten the nuts once. The same kind of testimony comes from a roadmaster on the Chicago & Northwestern. We admit that we are surprised at this result, which we had not anticipated from an inspection of the spring nut.

This appliance, which is a combined nut and spring washer, is shown in the engraving. It is a curved steel spring and threaded as a nut, the axis of the nut being about one-third the distance from one end of the washer. The concave side is placed against the angle bar and drawn up by turning the square head bolt from the other side of the rail. The reaction of the spring locks the bolt and nut and follows up the wear. The track springs "have a squeeze of about three tons. The springs for crossings and frogs have something like five tons each." The unequal length of the spring relatively to the bolt probably has a good deal to do with the holding of the thread. The makers of this spring nut account for the fact that bolts are not broken where it is used by the yielding of the spring when the extreme strain is brought on the bolt.





Details of Cylinder and Piping.

Fig. 1.—Pneumatic Shifter

The same company makes a spring washer which is much like the spring nut except, of course, that it is thinner and is not threaded. This has not been tested quite so long as the spring nut, but has been applied to frogs since January and has given the same kind of results as the nut.

This nut costs only about 1¼ cents to 1½ cents more than the ordinary nut and washer, while the company claims for it saving in expense of keeping track bolts tight and in renewal of bolts, in wear on the angle bar, in batter of the rail ends and in surface and alignment of track.

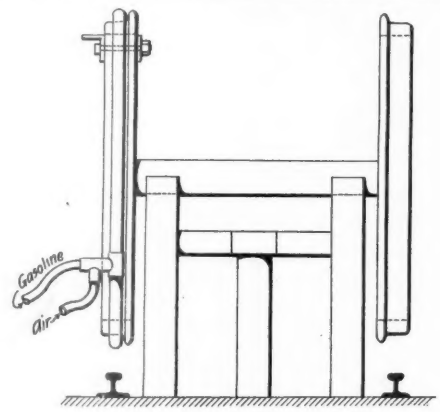


Fig. 4.—Method of Removing Tires.

The company has orders for 600 of these from the Pennsylvania Company to be used on track bolts one inch in diameter.

The Stratford Trolley-Car Disaster.

The cause of the electric-car disaster of August 6, at Stratford, Conn., is given in the Scientific American as excessive speed on an unballasted track. This is the result of a careful examination by one of the editors and quite likely is as accurate an explanation as will ever be discovered. It will be remembered that the disaster was to a well-loaded open excursion car, on a road which had been in use only three days—the extension of the Bridgeport & Stratford Electric Railway northward to Shelton.

The approach to the bridge, where the car was allowed to run too fast, was on a descending grade of 3 per cent. This approach is about 700 ft. long and the account before us states that no great amount of tamping or surfacing had been done. The car was a long one, with a short wheel base, and as the motorman did not fully shut off power until he was within 100 ft. of the bridge, it is estimated that the speed was 25 to 30 miles an hour. This speed undoubtedly produced a fore-and-aft "teetering" of the car, so as to intermittently lift a great portion of the weight off the front wheels. On striking the rigid track resting on the abutment of the bridge, the oscillation might easily be aggravated so that the wheel could mount the rail, as it did.

The floor of the bridge consists of sleepers 6 in.x 8 in., 14 ft. long; and from the photograph published they appear to be laid about 6 in. or 8 in. apart. Guard timbers notched into the sleepers and rising 5 in. above them, extend along about 12 in. outside of each rail. Between these guard timbers and between the rails, 1-in. boards are laid longitudinally. The car ran about 60 ft. after derailment before mounting the guard timber, and 30 ft. more before it fell off. As before stated, the car overturned, so that the weight of the motors and running gear added to the severity of the wreck. The Scientific American estimates that in view of the presence of the longitudinal floor boards, the notches for the ties and the height of the wheel flange, there was only 3 in. of guard rail available.

A mechanical engineer testified before the Coroner that in riding over the road about two hours before the disaster he was frightened at the excessive jolting of the car when it passed from the approach to the bridge.

The motorman was not inexperienced and nothing unfavorable is reported concerning his character.

The Coroner's jury rendered a verdict finding the motorman, George S. Hamilton, guilty of criminal carelessness. The jury declared, also, that the street railroad company was very negligent. It recommends that the Governor call a special session of the Legislature for the passage of remedial laws. The jurymen would require the use of inside and outside guard rails 8 in. high and lined with iron, on all electric and road bridges, the licensing of motormen by a competent board, the reduction of the number of working hours of motormen and conductors, and the establishment of a state board of six to have supervision of the construction and operation of all electric roads. Also that all cars be required to stop before crossing the bridge at Peck's Mill, thirty feet distant from the bridge, at either end.

Some Devices at the Meadows Shops of the Pennsylvania Railroad.

In going through the Meadows Shops of the Pennsylvania Railroad one sees many ingenious time and labor saving devices in daily use, and which were designed by the company's mechanical staff at the shops.

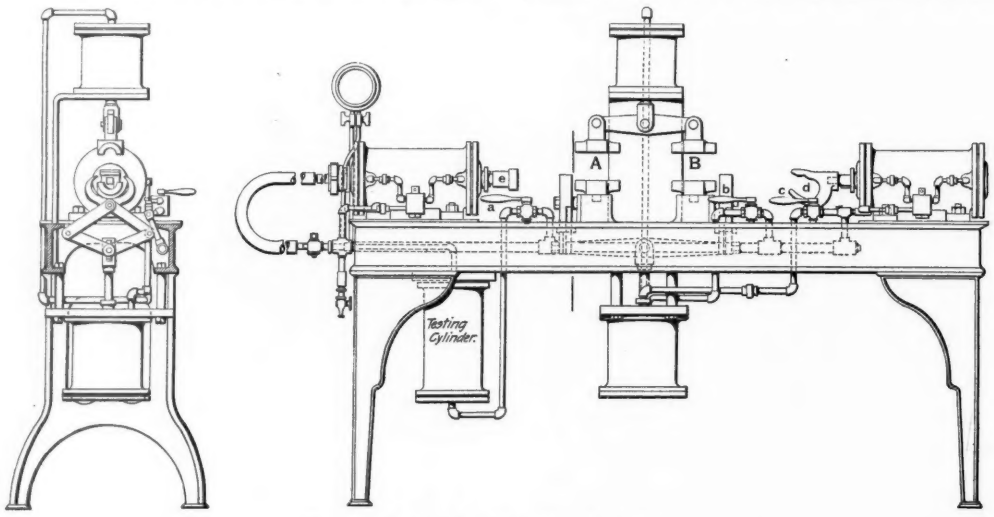


Fig. 2.—Machine for Fitting Up Brake Hose.

Compressed air is largely used; all of the machines that do heavy work are fitted with pneumatic hoists, and most of the machines have patent pneumatic shifters. A drawing showing the shifter assembled and also a detail of cylinders and connec-

tors is shown in Fig. 1. One of the large slotters has an air brake which is worked automatically with a shifter of this design, so that the man in charge can stop the tool at any point, even when running at the highest speed.

The large clamps in the boiler shop are worked by air. As soon as a sheet has its proper heat, it is placed between the jaws, a valve is opened and the sheet is clamped almost instantly, thus allowing no time for it to cool, as it does when the clamps are screwed together by hand.

Fig. 2 shows a pneumatic machine used in the air-brake hose department which attaches the couplings and splices the hose. The hose is placed between the clamps, A and B, the valve, b, is opened, forcing together the clamps, which grip the hose securely. A clutch coupling is placed in the jaw, d, the piston valve is opened, throwing the jaw out and forcing the coupling into the end of the hose; then a nipple is placed in the holder, e, and a similar operation forces it into the nipple end of the hose. The coupling clamps are placed in position by hand and when properly adjusted the valve, c, is opened. This valve works the jaws shown in the cross section. These close on the clamps, binding them around the hose at a great pressure. The bolts are put through the clamp holes and nuts run up. The hose is also tested on this machine by placing it in the nipple end and opening the valve, a, which allows the air to enter at the desired testing pressure. In this department is also a machine, shown in Fig. 3, which is used in cutting the bolts on the old air-brake hose clamps. Formerly the bolts were cut by hammer and chisel. The machine is worked by the foot lever shown, thus allowing both hands of the operator to be free to handle the hose, enabling him to cut two bolts at once. This is found to be a great saving of time over the old hammer and chisel method.

Fig. 4 shows a method now used in removing tires. The old method of raising the wheel by a hand hoist and building a wood fire around the tires until they were sufficiently expanded to drop off, took from half to three-quarters of an hour. In the new method gasoline is used, and the tank is placed some distance from the shops to guard against a possible explosion. A pipe leads from the tank to the track where the tires are removed. Here is a pneumatic jack designed at the shops. This jack has three plungers and two lifting rams, the tops of which are formed to receive the axles. The wheels are run over the jack and lifted about 6 or 8 inches from the ground. A one-inch pipe perforated with $\frac{1}{16}$ inch holes two inches apart on its inner side for gas jets is fitted loosely around the tire and close up to the flange, as shown. A pipe is connected to this burner having a $\frac{3}{8}$ inch hole at the entrance through which the gasoline is forced by an air pipe having a pressure of 40 lbs. Thus the air and gasoline are mixed, producing a blue flame of intense heat. Angle irons are clamped around the driving wheel, as shown, on to which the tire is tapped when sufficiently expanded. Here it rests until it is cool enough to be handled. By this method a tire can be removed in from 10 to 15 minutes.

A method very similar to this was described and illustrated in the Railroad Gazette as long ago as May 12, 1887, and January 13, 1888. It was the invention of J. W. Gentry and G. W. O'Brien, of the Richmond & Danville; but instead of using gasoline they used kerosene and the apparatus was portable. The Pennsylvania Railroad made some experiments with it at the time in the West Philadelphia shops, a record of which can be found in the above issues of the Railroad Gazette.

Figs. 5 and 6 show a lathe attachment and chuck used in turning up metallic packing ring castings. Fig. 5 shows the chuck, which is made as shown, the rod, A, passing through the spindle of the lathe, having a hand wheel fitted to its outer end. By turning the wheel the cone, b, is drawn on the jaws, which in turn are forced together and grip the casting. In reversing the wheel the jaws are released and thrown back into position by the springs. As many sets of jaws are made as are necessary for the different styles and sizes of castings to be turned. The advantage of this chuck is that it is very simple to operate and there are no wrenches required. Fig. 6 shows the carriage, which is run up into its proper place, the tools adjusted and fed into the casting. The tools on the left enter the casting first, and those on the right follow, making the finishing cut. It will be noticed that there is a right and left hand thread cut on the feed screw, one being coarser than the other, which allows the finishing tool to feed slower than the roughing out tool and also causing the tools to feed from opposite directions.

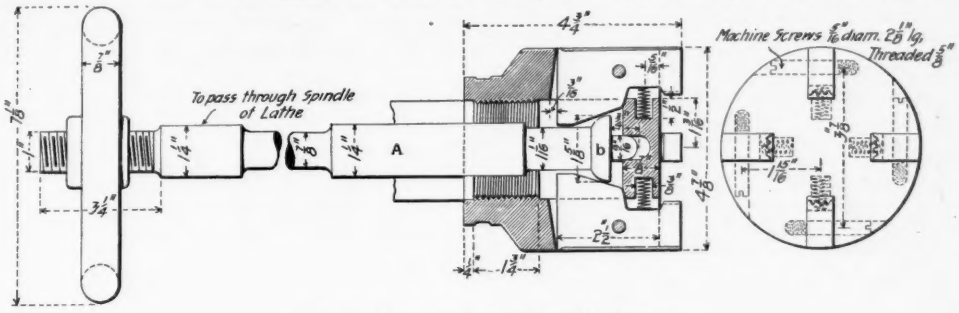


Fig. 5.—Chuck for Packing Ring Castings.

Fig. 7 shows a tool holder and tools used in planing the shoe, wedge and cellar parts of driving boxes It is made of tool steel. The tools are roughly set and fastened by the set screws; then finer adjustment is obtained by the long feed screw which passes through the tool post.

R. C. D.

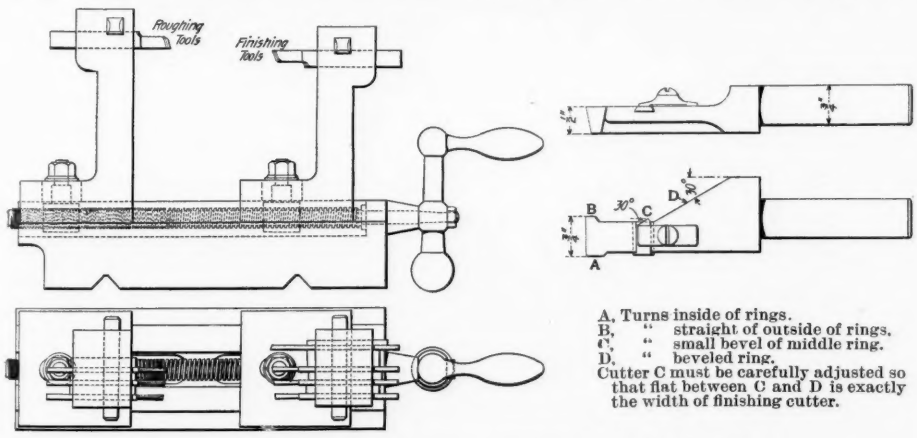

Roughing Tools
Finishing Tools
A, Turns inside of rings.
B, " straight of outside of rings.
C, " small bevel of middle ring.
D, " beveled ring.
Cutter C must be carefully adjusted so that flat between C and D is exactly the width of finishing cutter.

Fig. 6.—Lathe Attachment and Tools for Turning Metallic Packing Rings.

English Railroad Earnings for 1898.

The Blue book showing the traffic and earnings of the railroads of Great Britain and Ireland for the last calendar year has just been issued. Capital and receipts from all sources for four years have been:

	Miles of Road.	Capital (000 omitted).	Receipts.	Operating Expenses.	Per cent. Expenses.	Net.	Per cent. of Capital.
		£	£	£		£	
1898....	21,659	1,134,468	96,252,501	55,960,543	58	40,291,958	3.55
1897....	21,433	1,089,765	93,737,054	53,083,804	57	40,653,250	3.73
1896....	21,277	1,029,475	90,119,122	50,192,424	56	39,926,698	3.88
1895....	21,174	1,001,110	85,922,702	47,876,637	56	38,046,065	3.80

Herapath's Journal reviews the report as follows:

The Board of Trade return on the results of the working of British railways has always a chastening influence. For those who read rightly it dispels many illusions. No matter how prosperous times are here, we find millions of capital without any return whatever. Year by year we have to note the diminishing amount of capital enjoying what may be called a fat dividend, while the striking increase in expenditure, though not conspicuously burdensome when trade is good, will prove an awkward legacy when the pendulum swings the other way. The returns for the year ended December 31 last show 21,659 miles open, an increase of 226 miles in the year. In 1888 the mileage was 19,812 miles, an average increase of 184 miles per annum. In the decade ending with 1896 the average rate of expansion was 224 miles per annum. The capital paid up of all kinds was 1,134 millions sterling, an increase compared with the previous year of no less than 44¾ millions sterling. In the past ten years capital has increased by 270 millions sterling, an average increase of 27 millions sterling per annum. In the ten years ending with 1888 the aggregate increase was only 166 millions, or 16½ millions sterling per annum. In other words, while the mileage has increased by 25 per cent. in the past twenty years, the capital employed has been increased by 62 per cent. The number of passengers conveyed last year was in round figures 1,063 millions, against 742 millions ten years ago. The number of passengers has more than doubled in twenty-three years. The total revenue from all sources was £96,252,501, made up as follows:

		Per ct.
Passengers	£41,847,074	43.48
Goods	49,218,964	51.13
Miscellaneous	5,186,463	5.39

On the whole, goods traffic is losing ground as a revenue factor. It reached its zenith in 1873, contributing 55.11 per cent. of the then total revenue. Passengers are gaining slightly, contributing 41.31 per cent. in 1873, against 43.48 last year, but the greatest increase has been in miscellaneous revenue. In 1869, when the accounts were first kept, the total from miscellaneous sources was £1,620,000, while last year it was £5,186,000. Rents constitute the chief item under this head, and the increase is mainly due to properties purchased in connection with railway improvements and extensions. The net return on the capital employed was, we regret to say, the smallest ever known in English railway history. In 1860, when the accounts were first kept, the return was 4.19 per cent. on the capital employed. The highest return was in 1872, when 4.74 per cent. was earned. Last year the yield was but 3.55 per cent., and that it is a diminishing figure is certain from the following figures:

	Return per cent.
1896	3.88
1897	3.73
1898	3.55

Being a little over 3½ per cent. for last year, or what could be obtained by investors in first-class mortgages on real property. We have had bounding trade during this period, we cannot hope to see better times, and yet we see railway earnings in proportion to the capital employed decreasing in a steady ratio. This is the result of Parliamentary restrictions and exactions, increased accommodation and luxuries for the public, excursions on unremunerative terms, higher wages, and dearer coal and materials. It may be that some of the money being sunk in rolling stock may bear fruit in after years, that the tendency towards higher wages and shorter hours may some time or other find its level, that the boom in copper, iron, and tin will burst as suddenly as it has arisen—these are contingencies which the future has to reveal. All that can be said now is that the public are benefiting at the expense of those who have put money into railway enterprises.

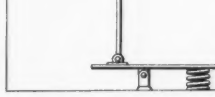


Fig. 3.—Pneumatic Bolt Cutter.

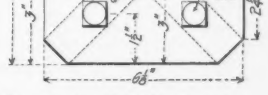


Fig. 7.—Tool Holder for Planning Driving Boxes.

The Manchester Ship Canal.

The report of the huge undertaking in the success of which the citizens of Manchester are so deeply interested, not to mention the large body of general shareholders, shows that there is a long hill to climb before even the fixed and cumulative capital charges can be met. For the half year ending June 30 the gross revenue of the Ship Canal proper amounted to £124,183, and the expenditure to £91,359, leaving a net balance of £32,826. The Bridgewater canals furnished an additional net revenue of £21,904, making a balance available to meet fixed charges amounting to £55,795. The interest on debentures issued to the public requires £44,742, a mortgage on surplus lands absorbs £1,000, and the interest on the debentures held by the Manchester Corporation amounts to £112,500, making a total sum of £158,242. There is consequently a deficit for the half year of £102,447.

A comparison with the corresponding period last year, however, shows that some progress is being made, the gross receipts of the Ship Canal showing an increase of £17,488, while the total net balance expanded by £11,126. For the past half year, therefore, the company is able to pay the interest on all the debentures in the hands of the public, whereas the revenue last year fell short by £2,073 of the sum required for that purpose. There is also a balance of £10,053 to go to the Manchester Corporation on account of arrears of interest. The amount at debit of net revenue account is now £905,712, as compared with £707,036 a year ago. Should the present growth of revenue be maintained it will be some nine years before the undertaking is able to overtake its fixed charges, and in the meantime a huge debt is being piled up for accrued interest. Although, therefore, the £8,000,000 of preference and ordinary shares may be of some prospective value, an investment in them must obviously be in the nature of a very long lock-up.—The Economist.

The Congo Railroad reported its earnings as 900,000 francs in December, 750,000 in January and 475,000 in February, and at this downward course of earnings speculators have been indignant.

RAILROAD GAZETTE

ESTABLISHED IN APRIL, 1856.
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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

If passengers would go out of cars at the front end and always go in at the rear it would prevent considerable confusion at way-stations, both large and small; and at large stations it would often save some time. A newspaper in New England has lately preached the railroads a little sermon on this subject; and the alacrity with which other newspapers, both in New England and elsewhere, have copied the sermon indicates that the subject is one in which some people are interested. The chief difficulty with this rule is that there must be many exceptions to it. At least one careful and enterprising superintendent, Abram Firth, of Boston, tried it more than 25 years ago, but gave it up because passengers took such delight in having their own way. The Long Island road is cited, by the newspapers mentioned, as carrying out this practice now. Superintendent Potter informs us that the rule has been in force for two years, and with good results; but at terminals, as well as at suburban stations, where there are 50 or 100 passengers to get out of a train and only half a dozen to get on, it has to be ignored. There can be no question that this custom ought to be encouraged wherever possible. In some cases it should be enforced; at least so far as to give good notice to the passengers waiting on the station platforms, to gather at the rear and not the forward end of the day-cars of a train that is coming in and which they wish to board. Brakemen can tell passengers, about to alight, to go to the forward end, but of course they cannot make them do it. It is quite necessary that conductors shall see that their brakemen work in harmony, and that trainmasters shall get all conductors to be active in the matter. Energetic action by one conductor and carelessness by another will surely create an unfavorable impression on the public; and the same result will follow if station agents are not required to co-operate with conductors.

One of the cases where it is not always an advantage for all the passengers to go out at one door is where a train is to stop four or five minutes. New Haven, Hartford, Albany and other large cities are, for many trains, way stations. There are many passengers to get off and many to get on. The people would perhaps get along more smoothly if the rule in question were observed. And yet, there being ample time, why should not all the outgoing passengers be allowed to get out as soon as they can? Unless those who are to get in are exposed to rain it would seem fair for them to wait. At New Haven the passenger from New York for Boston who came late and had to take a poor seat has a good opportunity during the temporary emptiness at New Haven to better himself; and this would seem to be one of the inalienable rights which the Declaration of Independence ought to have specified in the guarantee which it gave him at his birth. The most serious difficulty in this matter of guiding passengers is that of long trains with not enough brakemen to properly attend to all the entrances and exits. The Long Island road has signs in some of its cars, but it is not certain that these, without vigilant brakemen, have much influence on passengers. Where a lone woman wishes to get out of a car and is cornered on the car-platform while 25 men get into the car, it looks unseemly, to say the least. But can the railroad afford to have a brakeman for every car? One essential element in quick loading is often neglected, and that is that the brakemen, and the station men as well (where they are at hand) shall get the boarding passengers to use all the entrances. The greatest benefit from the Long Island rule is in cases where a few old people are coming out at one end of a car and others, not so slow, are waiting impatiently to get in, when another entrance, not noticed by them, is unused. "Both gates," constantly repeated, saves much time on the Manhattan Elevated.

Is the Passenger Train Shed a Mistake?

At almost all of the railroad terminals in the large towns, passenger trains enter and leave the stations by train sheds—roofed and enclosed. For a number of years the tendency has been to make these train shed roofs in single spans, the result being arches of colossal dimensions and of corresponding colossal cost. Obviously the same purpose could be accomplished by carrying the roofs on trusses of short span supported by pillars. Such roofs, however, would not be so beautiful and would not have the same advertising value.

It has often seemed in recent years that these great train sheds have been carried, in this country and abroad, to the point of extravagance in first cost and in maintenance. Obviously they are expensive to begin with, but many administrators of railroads have discovered that the maintenance is even a more serious matter than the first cost. The engine gases corrode the metal work so fast that the life is short, even when the trusses are carefully watched and scraped and painted; and the maintenance is a very heavy charge. Is it all worth while?

Something like a year ago the Erie Railroad was obliged to take down its steel train shed in Jersey City. Now the concrete platforms are protected, each by its own light wooden awning, carried on a row of posts up the middle of the platform. The descent from the great train shed to the humble wooden awning was abrupt and people who frequented the station supposed that this was only a temporary arrangement. We should not be surprised to find that it is made a permanent arrangement.

The writer of these lines has gone in and out of that Jersey City station almost every working day for a good many years past, and he has watched with especial interest the conditions developed by the use of the platform awnings. The sum of his observation is that the present arrangement is immensely more comfortable—cooler, lighter and pleasanter in every way—than the enclosed train shed could ever be.

Last winter was unusually severe. The snowfall was greater than it has been for years before in the vicinity of New York. The writer left that Jersey City station at midnight during the worst storm of the winter, the storm which tied up traffic on the streets of New York and over a large area thereabouts. So far as the storm itself went, it was at its height at the time when his train pulled out, although, of course, the great body of snow had not then fallen. Going to the train was not comfortable, but that walk of 50 yards up the unprotected platform was a trifle compared with the discomfort of going to the station and of getting from the station to his home at the end of the run. In short, the occasions during last winter, when passengers suffered any real inconvenience from the fact of there being no inclosed train shed must have been very few. On the other hand, the occasions when everybody enjoyed the coolness and the light and the absence of gas, were very many. The sum of the comfort as compared with the sum of the discomfort may have been something like one hundred to one, or more.

All of this being so, is it worth while to build great costly train sheds? Is it not really a serious mistake? Have we not been led astray by the notion that these train sheds have an important advertising value? These questions seem worth consideration.

Railroad Legislation of the Year.

We published in our issue of July 28 a review, from the transportation standpoint, of the work of the last Connecticut Legislature, the same being the last of a dozen articles, given since the first of January, telling of what had been done in different States by the Legislatures of 1899. To show the tendency of legislation throughout the country and to furnish a convenient summary for those interested in all the States we give herewith a brief abstract of the whole of these reports. In Arkansas, Kansas and Louisiana action of a somewhat radical nature has been taken, but outside of these States the new laws do not touch fundamental conditions, except in a partial manner. We note the principal laws of a general nature, taking the States alphabetically:

Arkansas. This State now has a railroad commission for the first time. The functions of this Board were briefly described in the Railroad Gazette of June 16.

Connecticut. The only law of a general nature was one modifying the restrictions on Sunday railroad traffic which have heretofore prevailed. The railroad commissioners may now permit trains to be run on Sunday. There was much discussion on the charters of various electric and street railroads, but no material change in general laws. The municipal taxation of street railroads has been the subject of much discussion, many charters having been granted in past years which were too liberal to companies.

Illinois. The law regulating the incorporation of street railroads was revised. An act was passed requiring street cars to be heated in winter.

Kansas. The Railroad Commission is abolished and the "Court of Visitation" takes its place. This law was reported in the Railroad Gazette of Jan. 20. The court is clothed with far-reaching powers and its constitutionality will no doubt be questioned in the higher courts on a number of grounds.

Louisiana. This State has a railroad commission for the first time. The regulations issued by the Commission were reported in the Railroad Gazette of March 24.

Maine. Railroads and street railroads are hereafter to be built only after the granting of a certificate of public convenience and necessity by the State Railroad Commission. A law was passed looking to the restriction of highway grade crossings, or rather to the strict regulation of the building of new crossings. A mileage ticket law passed in this state requires the issuing railroad to take back unused coupons at the end of a year.

Massachusetts. There was no general legislation of importance. An attempt to authorize street railroads to carry freight was defeated, but a number of individual roads were granted this right.

Michigan. The principal feature of the year's legislation in Michigan was the action of the Supreme Court in nullifying the two principal laws passed, the railroad tax law and the law to authorize the city of Detroit to buy and operate its street railroads. The same court has also declared void the law, passed some years ago, requiring the railroads to issue mileage tickets at a low rate, good for two years. The Legislature authorized negotiations with the Michigan Central and other roads holding special charters, looking to the surrender of these charters.

Minnesota. The Railroad Commission has been made elective. A law was passed which forbids increase of freight rates on grain, coal, lumber and live stock, though there is a proviso which permits rate wars if the normal rates are restored within 60 days. Minnesota, like a number of other western states, passed several petty regulations, such as requiring railroads to give a return pass to every drover, etc.

Missouri. Two of these police regulations are the most prominent laws in the list of new acts in this state. One of them requires railroads to have their trains connect at junctions and another requires companies to build connecting tracks for freight. A general street railroad law was passed, the provisions of which are liberal.

New York. A bill was passed authorizing the local taxation of the franchises of railroads in streets, the valuation in all the cities and towns to be made by a state board. Several acts of the nature of police regulation were passed, and also a number of amendments making improvements in the details of existing statutes.

North Carolina. The "Corporation Commission" has superseded the railroad commission, but with little, if any, change in function, so far as the railroads are concerned.

Oregon. This state now has no railroad commission.

Texas. About all of the railroad legislation passed in this state is of a police nature. The railroad commissioners may vary freight rates as often as they please to meet the competition of abnormally low rates on goods from outside the state. Freight cars for loading bulk freight must be apportioned to shippers according to a detailed schedule laid down by the Legislature. Railroads charging or collecting more than the bill-of-lading on freight, are guilty of felony.

A Few Railroad Statistics.

In our issue of July 21, page 522, appeared certain comparative statistics of the railroads of the United States. These were drawn from a sheet sent out to the press by the Interstate Commerce Commission and were compared with our tabulations of the Commission's statistics for previous years. Within a

few days we have received an advance copy of the Eleventh Annual Report of the Statistician, which covers all of his report except the six large statistical tables. In other words, it contains all of the summaries and of the generalization; and it may be well to publish a few further facts from this report. It must be remembered that the report is for the year ending June 30, 1898, and is therefore more than a year old.

This year was unusually prosperous so far as the volume of traffic is concerned, and it witnessed many reorganizations and a considerable improvement in various ways. At the end of the year there were 94 railroads in the custody of the courts, being a net decrease of 34, as compared with the year before. The operated mileage of railroads in the hands of receivers was 12,745, a decrease of 6,117 miles from 1897. The capital stock, funded debt and current liabilities of the roads in receivership amounted to $561,500,000, a decrease from the year before of $222,000,000 in capital stock and $208,500,000 in funded debt.

The miles of main line railroad in the United States at the end of 1898 summed up 186,396, being a net increase of 1,968 over the year before. The miles of line to 100 square miles of territory amounted to 6.28 as compared with 5.51 in 1890. The railroad mileage proportionately to the population has been declining in recent years. In 1898 the miles of railroad to each 10,000 of population amounted to 25.61; in 1890 it was 26.05, and it rose to 26.51 in 1893; since then the ratio has been steadily falling.

All of this, of course, is speaking of main line of railroad. The track, according to the Statistician of the Commission, aggregates 247,532.5 miles, of which second track was 11,293 miles, and yard track and sidings, 48,040, or 25.7 per cent. of the length of main line. The increase of length of yard track and sidings in the year amounted to 1,819 miles.

In 1898 each freight engine hauled 42,614 tons of freight, being 6,252 tons more than in 1897 and 10,700 tons more than in 1894. The ton-miles per freight locomotive amounted to 5,530,498 and the increase as compared with 1897 was over 866,000; and as compared with 1894 it was 1,500,000. The number of freight cars per 1,000,000 tons of freight carried fell from 1,888 in 1894 to 1,421 in 1898. The number of cars to each 100 miles of line has diminished from 728 in 1894 to 718 in 1898. This of course is an expression of the strong tendency towards cars of greater capacity.

The tables showing equipment with brakes and couplers are of little value now because of the great number of cars equipped during the year that has elapsed since the report was made. An effort is made to show the equipment fitted with power brakes, according to the kind of brake used and a similar table is compiled for automatic couplers. These tables will probably be of use as time goes on; but, for the reason given above, they are not of much use now.

It is interesting to discover that the total number of employees in 1898 was again greater than in any preceding year, namely, 874,558, which was 956 more than in 1893. It is well known that since 1893 the number has fallen off very materially.

Interesting analytical tables are given, showing the daily compensation of employees of all classes, for each year of the last seven; and this, doubtless, will be of interest to students of such questions. The aggregate compensation of railroad employees for the year under review was $495,055,618, an increase of $29,500,000, as compared with the year before, and an increase of almost $50,000,000, as compared with 1895. This payment of over $495,000,000 to officers and employees is 60 per cent. of the total operating expenses.

We find that in 1898, 33.74 per cent. of the railroad stock of the country paid dividends and the average dividend on all the capital stock amounted to 1.78 per cent. This is a better showing than has been made since 1894, when 36.57 per cent. of the stock paid dividends.

The passenger-mile rate was 1.973 cents, being the lowest for 9 years and probably the lowest ever recorded. The earnings per passenger train-mile were 97.419 cents, about 3½ cents more than in 1897, but smaller than in any preceding year.

The ton-mile rate was 7.53 mills, being the lowest recorded. Yet the revenue per freight train-mile ($1.73) was greater than in any one of the eight years which preceded the year under review. Here we see the effect of the modern heavy load.

Annual Reports.

Southern Railway.—The report of the Southern Railway for the year to June 30, 1899, is not only a record of heavy expansion in earnings and in traffic, but also in mileage and in capital accounts. The final income results for the year were very satisfactory as regards earnings over charges and progress made in decreasing the cost of transportation. The surplus was $2,095,000, nearly double that of 1898, which for the first time crossed $1,000,000. The balance over charges since the organization of the company in 1894 up to that time had been rather small, although enabling the company to begin payments of 1 per cent. annual dividends in January, 1897, on the preferred stock. Last week an additional dividend of 1 per cent. for 1899, making 2 per cent. for this year, was declared. These dividends call for $1,173,000, and after deducting that sum the company carries over into its new account $922,000.

The new lines added to the system in 1899 aggregated 727 miles. They were taken over at various periods of the year, and as their operations appear in the Southern Railway Company's accounts only for the period during which it worked them, exact comparisons of earnings are not possible. The income account, for instance, shows the results in an average mileage of 5,378 miles, against an average of 4,937 miles in 1898. The earnings and charges for 1899 were as below:

	1899.
Gross earnings from operation	$25,353,686
Operating expenses and taxes	17,356,355
Net earnings from operation	$7,997,331
Other income	328,470
	$8,325,801
Interest and rentals	$6,207,253
Other deductions from income	24,028
	$6,231,281
Balance	$2,094,520
Dividends	1,172,904
Surplus	$921,616

On the mileage above named the increase in gross earnings is reported as $4,257,000, and in net $1,403,000. Figures given in the report covering the operations of the same lines in the two years show an increase in 1899 of $2,621,000, and in net of $960,000.

The lines taken over last year included the South Carolina & Georgia, 323 miles, the Mobile & Birmingham, 149 miles, and the Atlantic & Yadkin, 166 miles. These acquisitions gave the company lines into Mobile, Ala., Charleston, S. C., and strengthened its position in North and South Carolina. This increase of mileage has been a feature of each year's operation of the Southern Railway since it took over the lines of the Richmond & West Point Terminal. On June 30, 1895, when the lines included in the reorganization had all come into possession of the Southern Railway, it worked 4,392 miles; its lines now aggregate 5,959 miles, an increase of 35½ per cent.

The changes in capital account, resulting chiefly from the expansion of the system in the past 12 months, are represented by an increase in the capital stock of $2,710,000; in the direct funded debt of the Southern Railway of $1,769,000, and of $10,508,000 in its leasehold obligations. These additions bring the direct funded debt as of June 30, 1899, up to $103,932,000, and the leasehold securities, including temporary certificates of indebtedness, issued in financing such purchases, to $24,458,000. The total capitalization is $308,692,000, of which $180,000,000 is stock. The increase in capital stock noted above was in preferred shares, sold to provide in part for the purchase of the capital stock of the South Carolina & Georgia road; this brings the outstanding issue up to $60,000,000, the total authorized amount. The only bonds of the Southern Railway itself, issued in the past year, except divisional liens, on account of new roads taken over, amounted to $1,000,000, being part of those reserved in the reorganization for new construction or acquisitions; the amount still available in this fund is $13,900,000, but it is stated that it is not expected to make further withdrawals in the present year.

Construction and Equipment.

The capital improvements available from the proceeds of this $1,000,000 of bonds, and carried out during the year, amounted to $835,295, of which $309,528 was expended for air brakes and couplers; $175,771 for new equipment and $350,000 for new construction, of which the largest part was for real estate. By going through the five annual reports issued by the company we find that the total capital additions for new construction or new equipment, since 1894, have been over $5,000,000; of this $2,941,000 represented the cost of new construction and real estate, while $2,200,000 was for new equipment. This, however, by no means gives an adequate idea of the immense amount of reconstruction and improvement work which has been carried on. The road has virtually been rebuilt in many particulars. A large part of the cost of this work has been charged to operating expenses. The additions to capital account represent only new and additional property. All this work has been carried out without creating a floating debt at any time. On June 30 last the current assets, excluding over $1,000,000 of materials and supplies, exceeded the current liabilities by over $1,000,000, and the cash on hand was about $3,000,000.

During 1899 the new equipment added, at a cost of $727,300, was 15 locomotives, 6 passenger cars and 1,258 freight cars, the whole cost being charged against operating expenses. The total increase in the freight equipment was 2,788 cars, part of these including those acquired with the new lines. The new equipment added during the year consisted of the 15 locomotives above noted, 17 passenger cars and 1,506 freight cars; 502 freight cars, 7 passenger and 13 locomotives were destroyed. The equipment on June 30 last consisted of 764 locomotives, 682 passenger cars, 23,912 freight cars and 446 road service cars.

At the close of the year 77 per cent. of the freight equipment had air brakes and 88.7 per cent. automatic couplers. The total cost of safety appliances in the last four years has been $720,964, divided as follows: $582,605 for air brakes on 10,074 cars; $117,289 for couplers on 6,954 cars, and $21,070 for air brakes on locomotives.

Traffic Statistics.

The traffic statistics given in the report cover the operation of the same lines in the two years, or 5,255 miles of road, so that comparisons of operating results are facilitated. The gain in gross revenue on this mileage was $2,620,589, or 11.69 per cent., and was about equally divided between passenger and freight business; the former increased $1,330,000, or 23½ per cent., and the latter $1,270,000, or 8.68 per cent. Both the passenger and freight rates declined, but the train-mile earnings were higher in each case than in 1898, 4.90 per cent. for freight, and 7.28 per cent. for passenger trains. Both the ton-miles and passenger-miles gained in about twice as large a ratio as did the tons and passengers respectively. The chief statistics covering these operations follow:

Freight:	1899.	1898.
Freight revenue	$15,901,845	$14,632,377
Tonnage	10,220,000	9,646,226
Ton-miles*	1,771,925	1,587,694
Ton-mile rate	c.897	c.922
Av. train haul (miles)	173.4	164.6
Train-mile earn.	$1,451	$1,383
Av. load per loaded car (tons)	12.15	11.68
Av. train load (tons)	161.5	150
Train miles	10,969,005	10,581,348
Passenger:		
Revenue from pass.	$6,980,552	$5,650,767
Total pass. train receipts	$8,876,929	$7,485,406
Pass. carried	5,118,000	4,356,254
Pass.-miles	311,020,836	243,420,784
Pass.-mile rate	c.2.244	c.2.321
Av. distance per pass.	60.77	53.66
Train-miles run	8,277,352	7,487,770
Train-mile earn.	$1.07	$.999

* 000 omitted.

Of the increase of $1,661,000 in operating expenses, about $1,201,000 was on account of maintenance, the equipment charges increasing nearly 30 per cent. and maintenance of way and structures over 10½ per cent. The cost of conducting transportation increased over 5¼ per cent., as against increases shown above, of 11.6 per cent. in ton-miles and of 27¾ per cent. in passenger-miles.

Brooklyn Rapid Transit.—The Brooklyn Rapid Transit Co., by its acquisitions of the past few months, controls practically the whole transit facilities of Brooklyn. The Metropolitan Street Railway of New York exceeds it in volume of earnings, though having less than half the track. The Brooklyn Rapid Transit Co. a year ago operated 266½ miles of track, which in the 1898 fiscal year earned $5,491,664; on June 30 last it controlled 504 miles of track, the earnings of which in the preceding 12 months had been $11,393,273.

Most of this expansion has occurred since last April, the lines taken over being 130 miles (track) of the Nassau street railroad; 42 miles (track) of elevated structure; (21¾ miles additional are controlled but not yet transferred); the remainder of the 238½ miles of new track was mostly steam road, which has been re-equipped with electric power. The very heavy expansion in earnings on these electric lines, may be instanced by the fact that the $11,035,216 earned in 1899 by the lines included in the Brooklyn Rapid Transit organization in June 30 last, was $1,158,215, or 12 per cent. more than the same lines earned in 1898, and $1,692,000 over their receipts in 1897.

The summarized income results on the Brooklyn Heights road, which is the operating company holding the leases of all the roads, are shown below:

	1899.	1898.	Changes.
Gross earnings	$7,412,434	$6,616,360	Inc. $796,074
Oper. exp.	4,669,571	4,232,206	Inc. 437,164
Net earnings	$2,743,063	$2,384,155	Inc. $358,908
Net income	2,743,076	*2,569,613	Inc. 173,462
Fixed charges	2,289,908	2,482,349	Dec. 273,440
Surplus	$453,167	$87,264	Inc. $365,902

*Includes income from guarantee fund $181,369, which in succeeding year was paid to Brooklyn Rapid Transit direct.

The expenses include a charge of $529,212 for damages, a large part of which was on account of accidents in preceding years. It is interesting to note that with an increase of $796,476 in gross receipts, transportation expenses proper were only $70,788 higher. The figures given above include the operations of the new lines for such periods, mostly very short, as they were operated in the Brooklyn Rapid Transit system in 1899, their earnings being included in the 1898 figures for corresponding periods, to facilitate comparisons. The above surplus accrues to the Brooklyn Rapid Transit Co. The total receipts of the latter and its charges are shown in the following summarized income account for the 12 months to June 30 last:

Total receipts	$842,375
Charges	379 825
Surplus	$462,550
Total surplus. June 30, 1899	678,128
Deductions from surplus:	
For new equipment and construction	$300.482
Extinguishing old deficits	321,174
Profit and loss	1,930
Total deductions	$623,587
Surplus forward	54,541

President Rossiter estimates that the gross receipts in the current fiscal year will reach $12,000,000 and that running charges will absorb 55 per cent. of this amount. This will leave a balance of $5,400,000 to meet fixed charges of $3,406,000 and dividends on $45,000,000 of stock.

A facing point switch without a distant signal would be just as good as one with the signal, if we

could only be sure that no one would ever make a mistake. The following item from a recent daily paper, shows that at a certain point on a certain road this immunity from mistake has been enjoyed for 50 or 60 years; but the evil day came at last and a "crack" train got badly bumped in the nose. The passengers were scared but, fortunately, were not seriously hurt. The officers of the road, however, if we may credit the reporter's version, were not scared until their Nemesis appeared a second time. As these incidents occurred on a very busy line between two big cities the reader will be glad to see, by the last sentence of the item, that the second warning was heeded:

"A second collision, precisely similar to that of last week, was narrowly averted at the F Street crossing yesterday. The switchman who took the place of Moriarity, who caused the first collision, did precisely the same thing his predecessor had done and threw the eastbound train to the westbound track. It was only by luck that another serious collision did not result. The matter was reported to headquarters and the switchman was discharged. This is the second time in ten days, and the second in the history of the road, that such a mistake has been made by switchmen at his point. As a result of yesterday's accident the switch will be replaced by an interlocked switch."

NEW PUBLICATIONS.

Cassier's Magazine for August, which has just appeared, is an "electric railway number." It is a stout volume of 284 pages, to say nothing of advertisements enough to make a very respectable magazine. There are 18 different articles written by recognized authorities and covering all fields of electric railroad work. As is usual with this magazine, the illustrations are fine.

TRADE CATALOGUES.

The S. Flory Mfg. Co., of Bangor, Pa., has just issued a 99-page, 9½ in. x 12 in., catalogue descriptive of the products of the company. Forty-four pages are devoted to steam and electric hoisting engines, of which the company makes a large variety. The rest of the book contains illustrations, descriptions and prices of stationary engines, slate and stone working machinery, boilers and dredging machines and a chapter on the suspension cable system of hoisting and conveying. The catalogue is well printed and the cuts, of which there are more than 100, are especially good.

Electric Mine Locomotives.—The Baldwin-Westinghouse combination has issued a new catalogue of electric mine locomotives for underground hauling. The catalogue gives illustrations and descriptions of a number of different sizes of engines which are built regularly, of weights from 4,000 up to 26,000 lbs., of gage from 20 in. up to 51 in. and of length from 9 ft. 4 in. up to 12 ft. Tables are given showing drawbar pull and hauling capacity of the various examples of the different classes.

The Railroad Testing Laboratory.

Mr. J. A. Carney, Master Mechanic of the Chicago, Burlington & Quincy, recently discussed the advantages of railroad testing laboratories at a meeting of the St. Louis Railway Club. Among other things, he said the cost of maintenance of a moderate size, well equipped laboratory amounts to from $2,500 to $5,000 a year, and that this is cheap when it insures the use of good materials. Service tests are much more expensive if the material proves unfit for the purpose. The moral effect of laboratory testing was strongly brought out and in this connection he said:

"The moral influence of a railroad laboratory on the manufacturer is peculiar. No implication is made that the manufacturer is dishonest, but he is a little more particular about his product if he knows it is to be submitted to a careful laboratory inspection. Some years ago it was reported that the laboratory of a certain railroad had been closed. The report was without foundation, but, nevertheless, the manufacturers were of the impression that it was true, and they were not so particular about their products as they had previously been. As a result, more material of all sorts was condemned in a few months than in any two years since the laboratory had been in existence."

Mr. Carney seems to be in full accord with the views set forth in a paper on this subject by Mr. S. S. Voorhees, of the Pennsylvania Railroad, which was published in our issue of August 4. Mr. Carney was formerly Engineer of Tests at Aurora.

Air Brake Inspection on the N. C. & St. L.

General Manager J. W. Thomas, Jr., of the Nashville, Chattanooga & St. Louis, has sent us his records, for the last four months, showing the number of freight cars of which the air brakes were found unserviceable when the cars were ready to leave the Nashville yard. We summarize these records below, the first table showing the total number of cars and the names of the companies which furnished the brakes with which the cars are equipped. One of the significant features of the exhibit is the very large percentage (79) of unfit cars among those equipped with one kind of brake; and another is the fact that a large percentage (59) of the total number of unfit cars was owned by other than railroad companies. Presumably the brake that made such an unfavorable showing was found largely on private cars.

N., C. & St. L. Ry., Nashville—Four Months, 1899.

	Number of Air-braked Cars Forwarded.				Total, four months.
	April.	May.	June.	July.	
Westinghouse A. B. C.	4,506	4,731	4,594	4,542	18,373
New York A. B. C.	634	651	735	651	2,671
Landsberger	28	27	29	13	97
Boyden	4	9	9	13	35
Crane	1	3	2	8	14
Haberkron	1	0	0	0	1
Total	5,174	5,421	5,369	5,227	21,191
Total in good condition	5,126	5,354	5,305	5,183	20,968
Average of same per train	10	10	11	11	
Air-brake cars cut out	48	67	64	44	223
Ownership of these:					
Railroad companies.	17	37	23	20	97
Private car lines...	31	30	41	24	126

Causes of Air Brake Inefficiency.

	W's'h'e.	N. Y.	L'd's'g.	B'd'n.	Cr.
Triple valves out of order	14	6	45	1	...
Leaky slide valves	3	...	...	...	...
Emergency valve leaking	5	...	...	...	...
Triple blowing at vent port	..	21	...	...	...
Blowing at exhaust	1	13	32	4	6
Release valve leaking	6	1	...	...	...
Emergency valve leaking	4	...	...	...	...
Check valve broken	2	2	...	...	...
Total	35	43	77	5	6

Train pipe broken	26
Brake rigging out of order	11
Release valve leaking	10
Part of triple gone	1
Broken piston in brake cylinder	4
Sand hole in triple body	1
Blowhole in auxiliary reservoir	1
Drain cup union cracked	1
Cylinder packing worn	1
Auxiliary reservoir cracked	1
Total	223

TECHNICAL.

Manufacturing and Business.

The Caswell Car & Improvement Co., of Chicago has on exhibition at Chicago a flat-bottom gondola car of the usual dimensions which is provided with doors in the floor, so that it can be unloaded either by dumping or shoveling. No part of the load on the doors is carried by chains.

The Chicago Malleable Castings Co. has bought seven and one-half acres of ground at West Pullman, Chicago, and will build a malleable iron foundry.

W. J. Carlin of Pittsburgh has opened offices in New York, under the management of Andrew Harper, in the Downing Building, 108 Fulton St.

According to newspaper advices from Scotland the Glasgow Tramway Committee has accepted the tender of the E. P. Allis Co. for engines. The price mentioned is £114,544.

The Electric Axle Light & Power Co. will, on Sept. 1, remove its offices to 100 Broadway, New York City.

The Pressed Steel Car Co. has received an order for body and truck bolsters for 500 Indiana, Illinois & Iowa cars.

The Chicago Pneumatic Tool Co. has had considerable success in the introduction of the Boyer long-stroke riveting hammer. These are used in driving ⅞-in. and 1-in. rivets. They have been successfully used in the boiler shop of John Mohr & Son, Chicago, from whom particulars can doubtless be obtained.

Mr. Gustave R. Tuska, Assoc. M. Am. Soc. C. E. has lately been elected President and Chief Engineer of the Atlantic Construction Co., which Company has a number of contracts for large manufacturing plants in the South.

Iron and Steel.

The Sloss-Sheffield Steel & Iron Company, with an authorized capital stock of $20,000,000, was incorporated Aug. 16 in New Jersey by John B. Summerfield, S. B. Lawrence, Geo. E. Spencer and A. I. White of New York, and A. H. Larkin of Nutley, N. J. The company will manufacture steel and iron, etc. One-half of the stock is preferred, with 7 per cent. cumulative dividends.

Percival Roberts, Jr., of the A. & P. Roberts Co., has sailed for Europe.

The American Steel & Wire Co. has bought the property of the Garden City Wire & Spring Co. of Chicago.

The Nile Dam at Assouan.

The Engineer (London) of Aug. 11 contains a number of engravings from photographs showing the work in building the great dam of the Nile at Assouan. Nearly 8,000 men are employed, of whom about 500 are Europeans and the rest natives. The work has been pushed with vigor and success.

Cost of Equipment Repairs.

The annual report of the Southern Railway contains the following summary of average expense for repairs to each class of equipment per engine per mile, and per car per mile during the five years of the company's operations:

	1894-5. cents.	1895-96. cents.	1896-97. cents.	1897-98. cents.	1898-99. cents.
Locomotives per mile	4.19	4.12	4.89	5.58	5.69
Freight cars "	0.47	0.48	0 47	0.53	0.77
Passenger cars "	0.83	0.94	0.85	1.07	1.16

The Niles-Bement-Pond Co.

The following are the Directors of the newly organized Niles-Bement-Pond Co.: Alexander Gordon, President of the Niles Tool Works Co.; Charles A. Moore, of Manning, Maxwell & Moore; Clarence S. Bement and Frederick B. Miles of Bement, Miles & Co.; Gordon Shillito, Thomas J. Gaff and Daniel H. Holmes of Cincinnati; Frederick W. Gordon of the Philadelphia Engineering Works; George T. Reiss and James K. Cullen of the Niles Tool Works Co.; E. C. Burke of Cleveland; Walter L. Clark of the Niles Tool Works Co.; A. C. Stebbins of the Pond Machine Tool Engineering Works; W. S. McKinney of Pittsburg and Robert C. McKinney. The officers are: President, R. C. McKinney; First Vice-President, James P. Cullen; Second Vice-President, A. C. Stebbins; Third Vice-President, Walter L. Clarke; Treasurer, Charles L. Cornell; Secretary, E. M. C. Davis. Alexander Gordon was made Chairman of the Board of Directors. Frederick B. Miles and George T. Reiss were appointed Engineers. The capital of the new company is divided into $3,000,000 6 per cent. cumulative preferred and $5,000,000 common stock. Of this is issued $2,000,000 in preferred and $5,000,000 common, $1,000,000 in preferred shares being retained in the treasury to acquire minority interests in the Niles Tool Works Company. The various constituent companies will remain intact and will be operated separately. The main offices of the Niles-Bement-Pond Co., as well as the constituent companies, will be at 136 Liberty Street, New York. The new company has bought outright the properties of Bement, Miles & Co., The Pond Machine Tool Works, The Philadelphia Engineering Works and the controlling interest in the Niles Tool Works Co. All the office holders of the new company are Niles men.

Some Old Car Wheels.

Six Lobdell car wheels were taken out of service on the 22d day of last May, after an active life of two months less than 29 years; that is, five of them were cast in July, 1870, and one of them in June. They were removed because they were worn through the chill. These wheels were on gondola No. 428 of the Wilmington & Northern Railroad and were removed at the East Buffalo shops of the Erie. The Master Mechanic of the Wilmington & Northern says that these wheels were in continuous service. The body of the car was rebuilt about 10 years ago, but the wheels were left under it. The railroad has other wheels of the same period still running. The Lobdell people have recently received from Cuba a half dozen pairs of cast-spoke, cast-iron, chilled wheels that were made by Bush & Lobdell and Ross Winans in 1844. It is not assumed that these wheels have been in continuous use all that time, but they are interesting relics.

The Westinghouse Gas Engines in England.

We have recently told the principal facts about the organization of the British Westinghouse Electric & Manufacturing Co., which is to build works at once at Old Bafford, Manchester. It appears that as this scheme gradually developed a group of British capitalists became much interested in the matter of the Westinghouse gas engine and the upshot of negotiations was that these gentlemen decided to join the British Westinghouse Electric & Manufacturing Co. and add to the business of that company the further business of building gas engines and Westinghouse steam engines. Consequently the early plans for the Manchester works were considerably enlarged. The buildings to be erected now will be 1,000 ft. long and 450 ft. wide, in five longitudinal bays. The British Westinghouse Electric & Manufacturing Co. takes over the patents and business of the Westinghouse Machine Co. of Pittsburgh for Great Britain and the Colonies. Until the Manchester works are running, the Westinghouse companies in America will send to England the apparatus to fill the large orders now being received. Among these, there is an important order for gas engines of large size, to drive direct-connected electric generators, and negotiations are going on for gas engines to be used instead of steam engines for driving machinery in some large manufacturing plants. As our readers know, the Westinghouse Machine Co. has had running now for nine months a gas engine of 650 or 700 h. p.; one of 1,500 h. p. is now in hand. Processes for making gas have undergone a good deal of development and improvement very recently and it is believed that an actual revolution is impending in the substitution of gas engines for steam engines.

The Sanitary District, Chicago, Water Power.

In anticipation of the opening of bids for the water power at Joliet, Ill., August 23, by the Trustees of the Chicago Sanitary District, the Chicago Civic Federation has made public a report of its Committee appointed some time ago to determine the value of the proposed water power. It is estimated that to develop this water power a permanent investment of $2,700,000 will be required, and that allowing for operating expenses, depreciation, repairs and the losses in transmission, the cost per horse-power per year in Chicago will be about $15, on a basis of 24 hours a day. It is thought that at least 16,000 net h.p. will be available. For lighting purposes, the city now pays more than $30 per horse-power per year, on

a basis of 10½ hours per day, the current being obtained from a steam plant. The Civic Federation is of the opinion that no long time lease of the Joliet water power to a private corporation should be made at the present time; but that arrangements should be made whereby the city will control this power, using such current as is needed for lighting and other purposes, and selling the remainder. It is questionable, however, whether either the Sanitary District or the city could legally made an arrangement of this kind.

Failure of a Swing Bridge.

On August 17, in turning the center pier swing bridge at Ninety-fifth street, Chicago, over the Calumet River, the bridge broke at the pier, and the two ends fell into the water; no one was injured. The superstructure was damaged beyond repair. As a result of this failure the City Engineer has ordered two bridges on the North Branch of the Chicago River closed which are in a particularly dangerous condition, while it is probable that seven others cannot be continued in use much longer. It is estimated that $2,000,000 is needed to repair the Chicago bridges and rebuild those that are past repairing. Just at present there are no funds available for this work, but the accident to the Ninety-fifth street bridge may have the effect of hastening bridge matters at Chicago.

Rails for China.

The Imperial Railways of North China have asked for bids on 5,400 tons of 60-lb. T rails and about 700 tons of fish plates and bolts, for delivery in April, 1900. The bids will be opened in China, Sept. 20.

New Equipment on the Southern.

The annual report of the Southern Railway says that the equipment contracted for, to be delivered in September next, includes eight 10-wheel passenger engines and 15 21 in. x 28 in. consolidation engines; 10 first class passenger coaches; nine café, dining, postal and baggage cars; 500 ventilated box cars; 100 40-ft. flat cars; 500 double-hopper coal cars, and 10 caboose cars.

THE SCRAP HEAP.

The Santa Fe Pacific now employs about 120 Japanese on track repair work, and it is proposed to engage more of this class of men.

Electric Railroad Project in France.

Consul Skinner writes from Marseilles, July 12, that the Paris, Lyons & Mediterranean Ry. Co., headquarters at 88 rue St. Lazare, Paris, will build an electric railroad between Fayet and Chamounix, at the foot of Mont Blanc. The line will be in operation within 12 months, and it is to be preseumed that the company will be interested in propositions for machinery and equipment. Power is to be furnished by the River Arve. The cars are to be automobiles, each supplied with its own dynamo. The contract for building the road proper and providing the water-power has been awarded to Gagner & Fréres, of Annency, and Richard & Meynard, of Avignon.

The New Dry Dock at Baltimore.

Work was begun last month on the new dry dock at Baltimore, Md., for the Wm. Skinner & Sons Ship Building & Dry Dock Co., of that city. The dock will be 600 ft. long over all, 550 ft. on keel blocks, 60 ft. wide at the bottom, and will have 22 ft. of water on the sills at low water. The entrance will be of concrete faced with granite, and the basin itself will be of timber. It is intended to use four centrifugal pumps of 25,000 gal. capacity per minute each, and operated by electricity, although the power question has not been fully decided. The entrance will be protected by a steel caisson gate 60 ft. long on the bottom and 80 ft. on the top. The gate will have six 36 in. valves for filling the dock and will be furnished with pumps and valves for lowering or raising the water ballast of the gate itself. The contract for the dock (excepting the gate and the pumping plant) has been let to the Delaware Construction Co. of Wilmington, Del., and it is expected to have the dock ready for use by March 1, 1900. The plans and specifications were prepared and the work is being superintended by Ritchie & Ruple, civil engineers, of Cleveland, O.

Consolidations.

There are still some people who fear that consolidations, especially of transportation companies, will result disastrously to the general interests of the country. There is one example to which I want to call your attention, and which, I think, each of you will appreciate. Forty-seven years ago there was issued an annual pass over the Central Line of railroads, between Buffalo and Boston, and by the People's Line of steamboats to New York, this pass bearing the following signatures on the back thereof: Ezekier C. McIntosh, President, Albany & Schenectady RR. Co.; Erastus Corning, President, Utica & Schenectady RR. Co.; John Wilkinson, President, Syracuse & Utica RR. Co.; Henry B. Gibson, President, Rochester & Syracuse RR. Co.; Joseph Field, President, Buffalo & Rochester RR. Co.; William H. Swift, President, Western RR. Co.; Isaac Newton, People's Line steamboats; Job Collamer, Watertown & Rome RR. Co. Mr. E. D. Worcester, Secretary of the New York Central, says he rode on a ticket of this kind from Albany to Boston in the summer of 1852, and he remembers distinctly the signature of each of these Presidents.—George H. Daniels.

Two More Hudson River Tunnels.

Both branches of the Municipal Assembly of New York adopted a resolution providing for a hearing before the Joint Committee on Railroads on the application of the Manhattan and Jersey City Railway to construct and operate a double tunnel from Liberty and Washington Streets under the North River to the Jersey State line. Mr. H. W. Brinckerhoff is said to be one of the directors. Mr. C. P. Bleecker, the Chief Engineer, does not appear in any of our lists.

A public hearing will be given also to the Manhattan Tunnel Ry. Co.

The Fall River Strike.

The strike of freight handlers at pier 3 of the Fall River Line is at an end; the strikers voted to accept the terms offered by the company. The men are to receive 17½ cents an hour, which is to be the rate at all places east of New York.

Proposals for Building Transvaal Railroads.

Consul Macrum, of Pretoria, writes under date of July 6 to the State Department: "Referring to my report of June 13, 1899, re-construction of the Rustenburg and the Lydenburg railroads, I have to state that a notice has been published extending the time for the sending in of tenders on the construction of the Rustenburg line until Thursday, October 12 next, at noon. This is done for the purpose of allowing foreign contractors time to bid, and makes the time on both the Pretoria-Rustenburg and the Belfast-Lydenburg lines the same."

In the Railroad Gazette, July 21, p. 522, in a communication from Johannesburg, on contracts in the Transvaal, was published a copy of the invitation for tenders on this railroad work.

Dynamite and a Bridge.

A press despatch reports that the Chicago, Milwaukee & St. Paul bridge at Iron Mountain, Mich., was badly damaged Aug. 16 by dynamite. Men hunting for the bodies of Swanson and Rylander, who were drowned on Sunday, decided to use dynamite to bring them to the surface. One charge was placed in the water directly under the bridge and exploded, to the injury of the structure.

LOCOMOTIVE BUILDING.

The Kiushiu Railway of Japan has ordered from the Schenectady Locomotive Works 12 mogul engines.

The Louisville & Nashville has ordered from the Cooke Locomotive & Machine Works four 10-wheel engines.

The Schenectady Locomotive Works have received an order to build two locomotives for the Florida East Coast.

The Burlington, Cedar Rapids & Northern will buy five switching and 10 freight locomotives. We published a report last week to the effect that this road was in the market for locomotives.

The Richmond, Fredericksburg & Potomac has placed an order with the Richmond Locomotive & Machine Works for two 10-wheel engines, to weigh 140,000 lbs., with 102,000 lbs. on the driving wheels. Specifications call for 19 in. x 26 in. cylinders; 62 in. driving wheels; boilers of the extended wagon top type with 267 charcoal iron tubes 2 in. in diameter and 14 ft. 5 in. long; steam pressure, 180 lbs.; fireboxes, 96⅜ in. long and 42 in. wide and a tender capacity for 4,000 gallons of water. The special equipment includes Westinghouse brakes, Sterlingworth brakebeams, Janney couplers, No. 9 Monitor injectors, Crosby plain and Coale muffled safety valves, Leach sanding devices, Detroit lubricators, French springs and Standard tires.

CAR BUILDING.

The Hocking Valley will buy 30 box cars.

The Burlington, Cedar Rapids & Northern will buy 400 box cars.

The Pennsylvania Lines west of Pittsburgh are asking bids on 500 coal and 500 box cars.

The Flint & Pere Marquette is in the market for from 200 to 400 coal cars of 60,000 lbs. capacity.

We are informed, but not officially, that the Illinois Central has asked bids for building 500 cars.

The American Car & Foundry Co. has an order to build 19 freight cars for the Vera Cruz & Pacific.

It is reported that the Missouri Pacific has ordered 1,000 box cars from the American Car & Foundry Co.

The Bloomsburg Car Mfg. Co. has an order to build 24 flat cars for the Imperial Chinese Railroads.

The Hammond Refrigerator Line has ordered 100 refrigerator cars from the American Car & Foundry Co.

The Chicago & Alton has ordered the 100 furniture cars referred to Aug. 4 from the American Car & Foundry Co.

The Southern Railway has ordered 1,000 box cars of 60,000 lbs. capacity, from the American Car & Foundry Co.

The Lake Shore & Michigan Southern has ordered 10 cars for passenger service from the Barney & Smith Car Co.

It is reported that the Chicago, Burlington & Quincy will soon be in the market for more cars. We have no official information.

The 200 flat cars ordered by the Intercolonial, of Canada, from Rhodes, Curry & Co., Amherst, N. S., will be 35 ft. long and of 60,000 lbs. capacity.

The Mississippi River & Bonne Terre has placed an order for 12 freight cars with the American Car & Foundry Co. They will be built at the St. Charles Works.

The Chicago & Northwestern has ordered 500 stock and 250 refrigerator cars from Pullman's Palace Car Co. These are in addition to the 1,250 cars noted in our issue of August 4.

The Indiana, Illinois & Iowa has ordered 100 box cars of 80,000 lbs. capacity, from the American Car & Foundry Co. These are in addition to the cars noted in our issue of August 11.

The Great Northern has ordered eight sleeping cars, 10 day coaches, two parlor cars, one private car, eight mail cars and two chair cars from the American Car & Foundry Co. They will be built at the St. Charles shops.

The 100 wooden coal cars which the Chicago Great Western will build at its own shops will be 34 ft. long and 9 ft. ⅝ in. wide over sills. The height of the sides will be 42 in. and the capacity 60,000 lbs. Eight-inch I-beam body bolsters will be used as well as Barber trucks, McCord journal boxes, Monarch brake beams, Westinghouse brakes and Chicago steel couplers.

The 80,000 lbs. capacity steel coal cars which the American Steel Foundry Company of St. Louis will build for the Colorado & Southern are to be 34 ft. long and 9 ft. 2 in. wide (inside measurements), with sides 3 ft. 10 in. high. They will weigh about 32,000 lbs., and are for October delivery. The special equipment includes American cast steel bolsters, Westinghouse air brakes, Fulton brasses, Standard steel couplers, Pickering springs and Sterlingworth brake beams.

The 150 steel coal cars of 100,000 lbs. capacity ordered by the Western New York & Pennsylvania, and referred to last week, will weigh empty 35,000 lbs. and be 31 ft. 6 in. long and 9 ft. 6 in. wide. The axles will be furnished by the Carnegie Steel Co., Ltd., the bolsters will be pressed steel and made by the car builders, and Vogt diamond frame pressed steel trucks will be used. The special equipment includes Westinghouse air brakes, Tower couplers and National springs. The question of ordering 50 box cars is still pending.

BRIDGE BUILDING.

APPLETON, ONT.—Geo. Bradford of Almonte has the contract for the masonry work, and the Hamilton Bridge Works Co. the contract for the iron work for the new bridge over the Mississippi River at Appleton, Lenark County. (July 28, p. 544.)

BINGHAMTON, N. Y.—The D., L. & W., according to report, in connection with the contemplated viaduct across Chenango St., will build a new depot at the corner of Lewis and Chenango Sts.

CASPER, WYO.—Reports state that a bridge over the Big Horn River, estimated to cost about $10,000 or $12,000, is in contemplation. Fred. Bond, State Engineer.

CHICAGO, ILL.—Reports state that an order has been issued by Mr. Ericson, City Engineer, closing two bridges over the Chicago River, and condemning seven. The condemned bridges are old, and at least $2,000,000 are necessary to repair them or to build new bridges.

CLEVELAND, O.—Bonds for $291,000 for bridges and sewer works will be sold Sept. 6 by Chas. P. Salen, City Auditor.

DECATUR, ILL.—It is proposed to build a $40,000 bridge across Rock River at Grand Detour. J. H. Thompson, Clerk of Lee County.

DETROIT, MICH.—Plans have been prepared for a new bridge over Rouge River at Fox St. It will be 203 ft. long and cost about $13,700.

The time for receiving proposals for the two masonry bridges in Belle Isle Park has been extended by President P. H. A. Balsley until Aug. 22. (July 28, p. 554.)

DINGMANS FERRY, PA.—An iron bridge, according to report, is contemplated across the Delaware River. It will probably be built by Pike County. John C. Westbrook, County Surveyor, Milford.

DOVER, N. J.—See "Other Structures."

KESWICK, CAL.—The plans and specifications for a bridge across the Sacramento below Spring Creek as presented by the County Surveyor have been adopted and bids for its construction will be opened Sept. 7. Each bid must be accompanied by a certified check of $600.

MILWAUKEE, WIS.—The plans for the proposed Grand Ave. viaduct estimate the cost of the work at $140,000. The eastern approach will be 300 ft. long, and the western approach 200 ft. and the steel structure about 1,425 ft. The plans are to have a viaduct 60 ft. wide, with 40 ft. of roadway between the guards, and walks 10 ft. wide.

NEW YORK, N. Y.—John L. Shea, Commissioner of Bridges, wants bids or estimates by Thursday, Aug. 24, for building new gates for the Hamilton Ave., Ninth St., Third St., Union St. and Carroll St. bridges, Borough of Brooklyn.

ORILLIA, ONT.—Tenders will be called soon for a bridge on town line, North Orillia and Matchedesh. Particulars from R. H. Jupp or D. M. Harvie.

OTTAWA, ONT.—Perkins & Fraser have given notice of application to Parliament to construct a bridge across the Ottawa River at Bank St.

PALESTINE, TEX.—We are informed that the International & Great Northern RR. bridge over the Big Brazos River was not damaged by the recent floods. The only damage the company sustained, as far as bridges are concerned, was to a few wooden bridges and the approaches to the Big Brazos bridge.

PITTSBURGH, PA.—The bridge of the Pittsburgh, Cincinnati, Chicago & St. Louis across the Monongahela River, reports state, will be rebuilt and several of the spans on the south side approach remodeled.

Laughlin & Co., according to report, have given the contract for the masonry work of the new bridge across the Monongahela River to Drake & Stratton Co. The bridge is estimated to cost $225,000. (March 10, p. 177.)

PULASKI CITY, VA.—The time for receiving proposals for the steel highway bridge across the New River at Tawe's Ferry is extended until Sept. 16. There will be three spans 147 ft. each, and 200 ft. of wooden or steel approaches; width 16 ft. in the clear; height of floor, 30 ft. above mid stream at low water. The piers are to be of stone masonry or of steel cylinders, filled with concrete. Address J. R. K. Bell, Chairman, County Commissioners. (Aug. 4, p. 558.)

QUEBEC, QUE.—The Quebec Bridge Co., which proposes to build a bridge across the St. Lawrence River from Quebec, has received a number of proposals for building the bridge. The contract will probably be let this week. E. A. Roare is Engineer of the company. (April 14, p. 269)

Next week tenders will be called for the enlargement of the Graving dock here, for which Parliament recently voted $117,000. It is also expected that work on the new Intercolonial Railway station at Levis, involving an expenditure of $80,000, will be commenced soon.

ST. LOUIS, MO.—Public hearings have been begun by Capt. Burr of St. Louis, Maj. William L. Marshall of Chicago, and Maj. William H. Bixby of Cincinnati, on the proposed third bridge to cross the Mississippi River at St. Louis. O. J. Tullock is Chief Engineer of the East St. Louis & St. Louis Bridge & Con-

struction Co., which proposes to build the bridge. (July 21, p. 526.)

SANDSTONE, MINN.—The Engineers who are locating the proposed extension of the Chicago, Milwaukee & St. Paul, from St. Paul to Superior, have decided on the location of the bridge crossing the Kettle Creek. It is stated that the site is about one-quarter of a mile south of the Eastern Minnesota Railroad Bridge.

SMETHPORT, PA.—The McKean County Supervisors are contemplating building a bridge across Potato Creek in Farmers Valley. W. A. Young may be addressed.

TORONTO, ONT.—Bids are wanted until Sept. 2 for the steel superstructure, and until Sept. 6 for the substructure, for a bridge over the Don River, but it probably will not be built until next spring, total estimated cost of which will be about $4,000. P. S. Gibson & Sons, Engineers, Willowdale, Ont.

WESTERLY, R. I.—The Town Clerk of Westerly will receive bids for a steel bridge across the Pawcatuck River at Niantic, R. I., between the towns of Westerly and Hopkinton, until Aug. 29.

WILLOWDALE, ONT.—Tenders will be received by P. S. Gibson & Sons, Engineers Township York, for building superstructure of steel bridge 100 ft. span, in the Township of York, County York, Ont. Tenders will be received up to 5 o'clock p. m. on September 2, next.

Other Structures.

ATLANTA, GA.—The plans for the union station for Atlanta are completed.

BINGHAMTON, N. Y.—See "Bridge Building."

BIRMINGHAM, ALA.—J. W. McClain & Co. are the architects of the new office building to be built by H. G. Smith, at a cost of $100,000.

CASEY, ILL.—The Council has adopted plans and specifications for a $30,000 water and light plant. Bids are wanted.

CRIPPLE CREEK, COLO.—The Gold Belt Electric Co. has been organized to build an electric power plant. The incorporators are S. T. Smith, J. B. Hogarth and Thomas Keeley. The capital is $300,000.

DOVER, N. J.—The Delaware, Lackawanna & Western has proposed to the town of Dover, N. J., to build a new passenger station at that place provided the town will bear the expense, probably about $35,000, of building the two bridges which will be necessary to carry above the tracks the two streets which now cross the line at grade above and below the station, and also settle with the owners of adjoining real estate. The company has had prepared by Mr. Bradford L. Gilbert a plan of a handsome station, to be built of stone, with commodious platforms and approaches. For the station, the adjoining freight yard and changes of grade of tracks, etc., the road expects to expend about $75,000.

EAST MOLINE, ILL.—Reports state that J. D. Besler, General Superintendent of the Chicago, Burlington & Quincy, has plans for the new union station for East Moline.

HAMPTON, VA.—The Bank of Hampton will build a new four-story building to cost $40,000. J. C. Outten, Cashier, can give information.

NEW YORK, N. Y.—The New York, New Haven & Hartford is building a large freight yard at Oak Point, two miles out from its Harlem River terminus, New York City, where are to be laid about 20 miles of track. This yard is to relieve the terminal yard, which the business has outgrown. The contractors, Shipman & Daly, now have the grading nearly completed. The entire surface is very uneven, some of the ground being under water, so that a great amount of work has been necessary to make a level yard. The outer tracks in this yard will adjoin the water of the East River, and new slips will be built here for running cars to and from the car floats, by which freight business is carried on between the New Haven road and the various railroad terminals in Jersey City.

Proposals are wanted by the Warren-Scharf Asphalt Paving Co., 81 Fulton St., for furnishing and erecting 200,000 lbs. of structural steel work.

Plans have been filed with the Building Department by the Beth-Israel Hospital Association for a six-story and basement brick fire-proof hospital building, 100 x 78.4 ft., on the northwest corner of Jefferson and Cherry Sts., estimated to cost $100,000. Harris Cohen, President.

NORFOLK, VA.—J. E. R. Carpenter is the architect for the new business house to cost $60,000, to be built by Miller, Rhoades & Co.

PITTSBURGH, PA.—The new buildings of the Riter & Conley Mfg. Co., to replace those destroyed by fire, will be a structural shop 110 x 418 ft., store building 31 x 138 ft. and a power house 40 x 165 ft. All the buildings, except the latter, will be of steel construction.

SCHENECTADY, N. Y.—Reports state that the General Electric Co. has let a contract to the Hamilton Bridge Construction Co. for the iron work of a new building 250 x 150 ft.

SYRACUSE, IND.—The Osborn Company, Civil Engineers of Cleveland, O., are preparing plans and specifications for buildings for a new cement plant to be built at Syracuse, Ind. Some of these buildings will be of brick and steel and others of all steel construction and roofed, with corrugated iron. The plans will be completed in about two weeks.

VALDOSTA, GA.—The Plant System, according to report, will build a new depot and make other improvements, at a cost of $25,000. B. Dunham, General Superintendent, Savannah.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Atlantic & Danville.—Preferred, 1 per cent., payable Sept. 1.
Canadian Pacific.—Common, 2 per cent. and preferred 2 per cent., both payable Oct. 2.
Chesapeake & Ohio.—1 per cent., payable Oct. 25.
Chicago & Alton.—3 per cent., payable Sept. 1.
Chicago, Burlington & Quincy.—Quarterly, 1½ per cent., payable Sept. 15.
Delaware & Bound Brook.—Quarterly, 2 per cent. guaranteed, payable Aug. 21.
Iowa Central.—Preferred, 1½ per cent., payable Sept. 1.
Pittsburgh Junction.—Common, 2 per cent., payable Sept. 1.
Southern.—Preferred, 1 per cent., payable Oct. 4.
West Virginia, Central & Pittsburgh.—½ per cent., payable Oct. 7.

Meetings and conventions of railroad associations and technical societies will be held as follows:

American Association of General Passenger and Ticket Agents.—The annual convention will be held at Boston, Mass., Oct. 17.
American Society of Civil Engineers.—Meets at the house of the Society, 220 West Fifty-seventh street, New York, on the first and third Wednesdays in each month, at 8 p. m.
American Society of Railway Superintendents.—The annual convention will be held at Detroit, Mich., beginning Sept. 20. C. A. Hammond, Secretary, Asbury Park, N. J.
American Street Railway Association and Street Railway Accountants' Association of America.—The annual convention is set for Oct. 17, at Chicago, Ill. T. C. Pennington, Secretary, 2020 State St., Chicago.
Association of Engineers of Virginia.—Holds its formal meetings on the third Wednesday of each month from September to May, inclusive, at 710 Terry Building, Roanoke, at 5 p. m.
Association of Railway Superintendents of Bridges & Buildings.—The annual convention will be held Oct. 17, in Detroit, Mich. S. F. Patterson, Secretary, Concord, N. H.
Boston Society of Civil Engineers.—Meets at 715 Tremont Temple, Boston, on the third Wednesday in each month at 7.30 p. m.
Canadian Roadmasters' Association.—The annual convention will be held at Toronto, Sept. 20. J. Drinkwater, Secretary, Winchester, Ont.
Canadian Society of Civil Engineers.—Meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday at 8 p. m.
Central Railway Club.—Meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.
Chicago Electrical Association.—Meets at Room 1737, Monadnock Building, Chicago, on the first and third Fridays of each month at 8 p. m. J. R. Cravath, Secretary.
Civil Engineers' Club of Cleveland.—Meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.
Civil Engineers' Society of St. Paul.—Meets on the first Monday of each month except June, July, August and September.
Denver Society of Civil Engineers.—Meets at 3 Jacobson Block, Denver, Col., on the second Tuesday of each month, except during July and August.
Eastern Maintenance of Way Association.—The annual convention will be held Sept. 26 to 29 at Portland, Me. F. C. Stowell, Ware, Mass., Secretary.
Engineers' Club of Cincinnati.—Meets at the rooms of the Literary Club, 25 East Eighth street, on the third Tuesday of each month, excepting July and August, at 6.30 p. m.
Engineers' Club of Columbus, (O.)—Meets at 12½ North High street on the first and third Saturdays from September to June.
Engineers' Club of Minneapolis.—Meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.
Engineers' Club of St. Louis.—Meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.
Engineers' Society of Western New York.—Holds regular meetings on the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.
Engineers' Society of Western Pennsylvania.—Meets at 410 Penn avenue, Pittsburg, Pa., on the third Tuesday in each month, at 7.30 p. m.
Locomotive Foremen's Club.—Meets every second Tuesday in the club room of the Correspondence School of Locomotive Engineers and Firemen, 335 Dearborn street, Chicago.
Master Car & Locomotive Painters' Association.—The annual convention will be held Sept. 12 at Philadelphia, Pa. Robert McKeon, Secretary, Kent, O.
Montana Society of Civil Engineers.—Meets at Helena, Mont., on the third Saturday in each month at 7.30 p. m.
New England Railroad Club.—Meets at Pierce Hall, Copley Square, Boston, Mass., on the second Tuesday of each month.
New York Railroad Club.—Meets at 12 West Thirty-first street, New York City, on the third Thursday in each month at 8 p. m., excepting June, July and August.
Northwest Railway Club.—Meets on the first Tuesday after the second Monday in each month at 8 p. m., the place of meeting alternating between the West Hotel, Minneapolis, and the Ryan Hotel, St. Paul.
Northwestern Track and Bridge Association.—Meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.
Roadmasters' Association of America.—The annual convention will be held in Detroit, Mich., Sept. 12. J. B. Dickson, Secretary, Sterling Ill.
St. Louis Railway Club.—Holds its regular meeting on the second Friday of each month at 3 p. m.
Southern and Southwestern Railway Club.—Meets at the Kimball House, Atlanta, Ga., on the second Thursday in January, April, August and November.
Technical Society of the Pacific Coast.—Meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.
Traveling Engineers' Association.—The annual convention will be held in Cincinnati, O., Sept. 12. W. O. Thompson, Secretary, Elkhart, Ind.
Western Foundrymen's Association.—Meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. A Sorge, Jr., 1533 Marquette Building, Chicago, is Secretary.

Traveling Engineers' Association.

The seventh annual convention of the Traveling Engineers' Association will be held at the Grand Hotel at Cincinnati, O., commencing September 12, at 9 a. m. The various committee reports are nearly all in the hands of the printer.

American Institute of Mining Engineers.

The seventy-seventh meeting of the American Institute of Mining Engineers will be held in San Francisco, Cal., beginning September 25. The headquarters will be at the Palace Hotel. Secretary of local Committee of Arrangements, Mr. Edward H. Benjamin, 331 Pine St., San Francisco. A banquet will be given to the Institute by the merchants and manufacturers of San Francisco, and receptions will be given at other places in the State. A special train will leave Chicago by the Chicago & Northwestern Railroad at 5.30 P. M., Saturday, Sept. 16. The address of the Institute has been changed and all correspondence should be sent to R. W. Raymond, Secretary, 99 John St., New York.

Roadmasters' Association of America.

The seventeenth annual convention of this Association will be held at the Hotel Cadillac, Detroit, Mich., Sept. 12, 13 and 14, 1899. Committees have been appointed to report on the following subjects:

Advisability of Increasing the Length of Rails—Using Miter Joints, and Determine the Difference in Expansion of Light and Heavy Rails. V. T. Douglass, Chairman, C. & O. RR., Richmond, Va.

Track Joints—Results Obtained from Use of Various Devices. P. Rockwell, Chairman, R. M., M. K. & T. RR., Sedalia, Mo.

Standard Right of Way Fences. J. A. Prentice, Chairman, R. M., L. S. & M. S. RR., Toledo, O.

Paper—The Relation of Track to Traffic. F. R. Coates, R. M., N. Y., N. H. & H. RR., Stamford, Conn.

Embellishment of Station Grounds. M. Sullivan, Chairman, R. M., M. C. RR., Niles, Mich.

Paper—Standard vs. Compromise Cars, With Relation to their Effect on Track. C. C. Dunn, Sup't A. C. L., Wilmington, N. C.

Committee to Arrange for Seventeenth Annual Convention. John Doyle, Chairman, Supt. of Track, C. & W. M. RR., Grand Rapids, Mich.

These reports will be distributed during the meetings.

Central Railway Club.

The next regular meeting of the Club will be held Friday, September 8, 1899, at Dunkirk, N. Y., at which time the members will be the guests of the Brooks Locomotive Works. Through the courtesy of the Lake Shore & Michigan Railroad Company, a special train will be run from Buffalo for the accommodation of members and their friends. It will leave the Exchange Street Station, Buffalo, at 9 a. m., and Dunkirk will be reached about 10 o'clock. The business meeting of the Club will be called immediately after arrival and the time from 11 a. m. to 1 p. m. will be devoted to a tour of the shops. A luncheon will be served and the train will leave Dunkirk on the return trip to Buffalo between 3 and 4 o'clock.

The New York, Chicago & St. Louis Railroad Company extends the courtesies of its line on all passenger trains to and from Dunkirk.

In accordance with action taken at the March meeting the reports of the committees on "Freight Car Roofs" and "Round House Practice," which were presented at that meeting, will be taken up for further discussion and a special committee consisting of Mr. H. F. Ball, Mr. H. C. McCarty and Mr. E. G. Rouse will report their interpretation of the Rules of Interchange as revised at the annual convention of the Master Car Builders' Association last June. Members are asked to bring to the meeting blue prints showing the standard construction of box car roofs on their roads.

Eastern Maintenance of Way Association.

The seventeenth annual convention of the Eastern Maintenance of Way Association will be held at the New Falmouth Hotel, Portland, Maine, Sept. 26, 27, 28 and 29, 1899. There will be a room adjoining the Association rooms for exhibition purposes, provided by the Association, a nominal charge being exacted from each exhibitor. It is suggested that exhibits be in position early in the morning of the 26th. The following questions will be taken up for discussion:

How shall the right of way be maintained in a tidy manner with the least labor of trackmen?

The most efficient, durable and economical form for standard snow fence; also best form of wire right of way fence, giving size of wires, etc.

What is the proper relation between weight of rail and weight of rolling stock? Assuming a proper relation between weight of rail and weight of rolling stock, what is the most economical spacing of ties?

Under existing conditions would it not be economy for railroad companies in New England to treat all cross-ties chemically?

From a maintenance of way standpoint, the consideration of the relative merits of stone ballast, or gravel sprinkled with oil.

Review of previous year's discussions.

Committees appointed by the Executive Committee will submit reports upon these questions. An unusually complete exhibit of track tools and equipment is promised. The following excursions are announced:

Afternoon Sept. 27th, by courtesy of the Casco Bay Steamboat Co., a sail will be had through the islands of Portland Harbor and Casco Bay.

Thursday, Sept. 28th, by courtesy of the Maine Central, the Portland & Rumford Falls and the Rumford Falls & Rangeley Lakes Railroads, a special train will leave Union Station, Portland, at 7.30 A. M. for a run to the Rangeley Lakes.

Friday, Sept. 29th, by courtesy of the Maine Central Railroad, a special train will leave Union Station at 8 A. M., for a run through Crawford Notch and the White Mountains in New Hampshire to Mt. Washington and Fabyans.

This is the first meeting of the Association since last March, when the name was changed from the New England Roadmasters' Association. (July 14, p. 506.)

PERSONAL.

(For other personal mention see Elections and Appointments.)

—Mr. E. B. Underhill is reported to have resigned his position as expert to the Texas Railroad Commission. He was formerly on the Southern Pacific as Auditor. The reason for his resignation is not explicitly stated.

—Mr. C. W. Hotchkiss, formerly with the Chicago, Hammond & Western, has been appointed Chief Engineer of the syndicate which proposes to build railroad transfer yards and warehouses on the "Stickney" tract, Chicago. His office is in the Ellsworth Building, Chicago.

—Mr. W. H. Jiams has resigned the office of Treasurer of the Baltimore & Ohio Railroad. Mr. Jiams is nearly 77 years old and the oldest general officer in the service of the Baltimore & Ohio. He saw the very beginning of railroading in the United States, and was present when the Baltimore & Ohio was opened.

—Mr. C. P. Clark, President of the New York, New Haven & Hartford Railroad, has been abroad some months in search of health. He says now that he is advised by his physician to retire from active work and that it may be best that he should decline re-election to the presidency, and the rumors that he will decline are persistent.

—Mr. S. M. Towar, who was Chief of a Corps of U. S. Engineers making preliminary surveys through the Desplaines and Illinois River Valleys, died suddenly of heart disease at Joliet, Ill., one day last week. He was working under the orders of Major William L. Marshall, Corps of Engineers, U. S. A., making surveys for a ship canal.

ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Santa Fe.—A. W. Towsley, heretofore Car Service Agent of the Norfolk & Western, will become Chief Clerk to J. M. Barrs, Third Vice-President of the A., T. & S. F.; effective Sept. 1.

Austin & Northwestern.—C. R. Reilly on Aug. 1 was elected Secretary, and appointed Auditor of the company, with headquarters at Austin, in addition to his position as Chief Clerk to the Vice-President.

Baltimore & Ohio.—Andrew Stevenson, Assistant General Freight Agent at Baltimore, has been transferred to Philadelphia, with entire charge of the traffic of the Philadelphia Division between Philadelphia and Herring Run. Edward H. Davis, Division Freight Agent at Cumberland, Md., takes Mr. Stevenson's place at Baltimore. Mr. Davis is succeeded by James R. Bell, Chief Clerk of the General Freight Department. James Mosher, General Eastern Freight Agent, of New York, is made Assistant General Freight Agent. I. V. McNeal, Assistant Treasurer, becomes Treasurer, succeeding W. H. Ijams, resigned.

Central Vermont.—David Mackenzie, Superintendent of the New London Northern Division, has resigned.

Cleveland, Cincinnati, Chicago & St. Louis.—J. W. Cowper, formerly Engineer Maintenance of Way on the Cairo Division, has been appointed to a similar position on the St. Louis Division, with headquarters at Mattoon, Ill. Mr. Cowper is succeeded by J. G. Shillinger, with headquarters at Mt. Carmel.

Fitchburg.—F. O. Melcher, heretofore Acting General Superintendent, was made General Superintendent Aug. 15.

Galveston, Harrisburg & San Antonio.—At a meeting of the stockholders, held at Houston, Tex., Aug. 17, the following directors were elected for this line under control of the Southern Pacific: C. P. Huntington, of New York; J. Kruttschnitt, of San Francisco; Chas. Babbidge, of New York; W. G. Van Vleck, J. T. Mahl, W. B. Mulvey and C. H. Seger, of Houston. Immediately after the meeting of the stockholders the Directors held a meeting and elected the following officers for the ensuing year: C. P. Huntington, President; J. Kruttschnitt, First Vice-President; W. G. Van Vleck, Second Vice-President; C. B. Seger, Secretary; B. C. Cushman, Treasurer; Chas. Babbidge, Assistant Secretary and Assistant Treasurer.

Grand Trunk.—George T. Bell is appointed Assistant to the General Passenger Agent and Ticket Agent, with headquarters at Chicago, succeeding E. H. Hughes, assigned to other duties. Mr. Bell is succeeded by Geo. W. Vaux as Assistant General Passenger and Ticket Agent at Montreal.

Great Northern.—Howard James, Purchasing Agent for the Northern Steamship Co., has accepted a similar position with the G. N.

Illinois Central.—S. T. Lovett has been Acting Supervisor of Bridges and Buildings on the Tenth Division during the illness of T. J. Blincoe, now deceased. Mr. Lovett will probably continue in that position.

Iowa Central.—H. C. Laird, formerly Chief Clerk in the office of the General Ticket Agent, has been made General Passenger and Ticket Agent, succeeding W. G. Martin.

Los Angeles & Redondo.—Samuel Potts has been made Master Mechanic, succeeding W. N. Best, resigned.

Mexican Central.—C. B. Cox has been appointed Superintendent of Mecian Division, succeeding T. G. Mulhern, resigned.

Nevada Central.—C. L. McFaul has been appointed Assistant General Manager.

Norfolk & Western.—J. B. Connors has been appointed Superintendent of the N. & W. terminals at Norfolk, Va., succeeding H. H. S. Handy, resigned.

Pecos & Northern Texas (Pecos Valley & Northeastern).—E. W. Martindell has been appointed Superintendent and Assistant General Passenger and Ticket Agent, with headquarters at Amarillo, Tex.

Pennsylvania.—Mr. J. A. Anderson, Superintendent of the Relief Department, has been granted an indefinite leave of absence on account of ill health, and the department is now in charge of Mr. H. D. Ely, Assistant Superintendent.

Pennsylvania Company.—C. E. Rowe has been appointed Assistant Engineer Maintenance of Way, on the Louisville Division of the Pittsburgh, Cincinnati, Chicago & St. Louis, succeeding A. H. Wirth, transferred.

Pittsburgh, Johnstown, Ebensburg & Eastern.—Following the absorption of the Altoona & Philipsburg Connecting line into this company, U. S. Houck, Superintendent of the P., J., E. & E., has also been appointed Superintendent of the Main Line Division, formerly the A. & P. C., succeeding G. M. H. Good of the A. & P. C., resigned. Effective Aug. 1.

St. Louis, Peoria & Northern.—L. Faithorn, brother to the President and General Manager of the company, has been appointed General Freight and Passenger Agent at St. Louis, Mo., succeeding George B. Simpson. Mr. Faithorn, formerly Commercial Agent at Chicago, is succeeded there by R. M. Franks.

State Line & Sullivan.—O. A. Baldwin, formerly Secretary and Treasurer, has been made General Manager, with headquarters at Towanda, N. Y.

Virginia & Southwestern.—John Fitzgerald has been appointed Assistant to the Vice-President and General Manager, with headquarters at Bristol, Tenn.

Wheeling & Lake Erie.—J. F. Townsend, heretofore Assistant General Freight Agent, has been appointed General Freight and Passenger Agent, with headquarters at Cleveland, O. He is succeeded by E. B. Coolidge, with headquarters at Toledo, O. Effective Aug. 13.

RAILROAD CONSTRUCTION,
New Incorporations, Surveys Etc.

ALGOMA CENTRAL.—This line is now being located from Michipicoten Harbor, Ont., eastward, and the contracts will be let privately for grading and rock work as fast as the road is located. Information may be obtained from H. E. Talbot, Superintendent of Construction, Michipicoten River, Ont. (Aug. 11, p. 575.)

ATCHISON, TOPEKA & SANTA FE.—Surveys are in progress for the Fort Madison, Des Moines & Northwestern line from Ottumwa northwest to Omaha and Des Moines. It is stated that about 20 miles will be built this season. (Aug. 18, p. 588.)

This company, according to report, has decided to build a spur from Richfield, Cal., near the mouth of the Santa Ana Canyon, to run north to the company's oil wells in the northern part of the same county.

BALTIMORE & OHIO.—Engineers have been employed on the Pittsburgh & Western for some time, obtaining engineering data relative to the road. The Receiver, however, knows of no "improvements costing several million dollars" that are in contemplation. (Aug. 11, p. 575.)

An officer writes that there is no foundation for the report of an extension to be built from Barberton, O., to Copley, eight miles. (Aug. 4, p. 560.)

The Tylerdale Connecting RR. has been formed to build a belt line to connect the Chartiers branch of the Pittsburgh, Cincinnati, Chicago & St. Louis with the B. & O., a mile west of Washington.

Surveys have been made for a cut-off between Vigo and McArthur Junction, O., which will lessen the distance about five miles.

BURLINGTON, CEDAR RAPIDS & NORTHERN.—Colonel Thomas H. Brown of Sioux Falls, S. D., has announced his intention to obtain right of way for an extension from Worthington, Minn., northwest about 125 miles to Canova, S. D.

CALIFORNIA NORTHWESTERN.—Surveys are reported in progress for the San Francisco & Northern Pacific extension northwest along the coast of California into the redwood forests. (May 12, p. 343.)

CANADIAN NORTHERN.—John C. O'Neill of Kemptville, John R. Turnbull of Winnipeg, McGillivray & Gleason, Hugh Mann and Luke Madigan have the contracts in five-mile sections, aggregating in all 55 miles, for the Ontario & Rainy River line from Port Arthur, Ont., westward. John R. Turnbull has the contract for building all the bridges and trestles between Stanley and Fort William. (Aug. 18, p. 588.)

CANADIAN PACIFIC.—Breckenridge & Lund and Grand & Shady of Cranbrook, B. C., have the contract for building the Cranbrook North Star Line, 30 miles long. The first sod was turned July 20.

CHESAPEAKE & OHIO.—Stockholders will vote Oct. 24 on the question of issuing not more than $3,000,000 bonds at 4%, payable Dec. 1, 1999, for the Greenbrier extension up Greenbrier River, through Marlington, W. Va., to White Sulphur Springs. (See Railroad News Column, July 28, p. 547.)

Shanahan, Serpell & Co. of Louisville, Ky., have the contract for masonry, and A. & P. Roberts Co. of Philadelphia for the iron work on the elevated structure in Richmond, Va.

CHICAGO & NORTHWESTERN.—John Duffy of Des Moines, Ia., has the contract for grading the Harlem & Kirkman extension from Kirkman, Ia., south about six miles to Harlem, on the Chicago, Rock Island & Pacific. (Aug. 11, p. 575.)

CHICAGO & WABASH VALLEY.—Benjamin J. Gifford of Kankakee, Ill., President of this company, has made a proposition to the people of Rensselaer, Ind., to build his line to that place, instead of along the original route. The line as projected and partially completed, is from Kinman, Ind., southeast to connect with the Illinois Eastern. (April 7, p. 253.)

CHICAGO, INDIANAPOLIS & LOUISVILLE.—This company has completed the Clear Creek & Harrodsburg branch from Clear Creek, Ind., to Harrodsburg, nine miles, and it is open for business.

DAVENPORT, CLINTON & EASTERN.—Grading was begun last week in the vicinity of Clinton, Ia., on this connecting line from near Davenport, to run northeast 35 miles to Clinton. H. B. Schuler of Davenport, Ia., is President, and C. E. Dearborn, Chief Engineer. (Aug. 11, p. 575.)

DENVER, OKLAHOMA & GULF.—This company was incorporated in Oklahoma Aug. 14, with a capital stock of $8,000,000, to build a railroad from a point in Ellis, Trego or Gove Counties, Kan., to run southeast 400 miles, through Oklahoma and Indian Territories to some point in Grayson, Cook or Montague Counties, Tex. The incorporators are: E. C. Darley, Charles J. Dorran, W. C. Oakley, T. K. Dorrance, S. B. McConnell, Henry Hudson, W. H. McLean, A. A. Humphrey and J. M. Brooks.

FREDERICK, THERMONT & NORTHERN.—Surveys have been made for much of the distance on this line from Frederick, Md., north through Lewiston, 30 miles, to the Pennsylvania State line. L. V. Baughman of Frederick is President.

GREEN RIVER VALLEY.—This company was incorporated in Tennessee Aug. 15, to build a railroad from Nashville northeast to the State line in Pickett County, and thence into Eastern Kentucky. The incorporators are: Ford Reddick, Charles Le Roi, W. W. Redman, C. H. Williams and T. H. Sneed.

GRIFFITH & NORTHERN.—This company was incorporated in Indiana Aug. 19, with a capital stock of $200,000, to build a railroad from Griffith, Lake County, to run north about 10 miles to a connection with the Chicago, Lake Shore & Eastern, near Clarke Junction, with a branch from the main line west to a connection with the Elgin, Joliet & Eastern at Hammond. The incorporators are: K. K. Knapp, R. G. Hurd, C. H. Ackert, N. F. Redelwiz, A. F. Banks, William Duff Haynie, F. T. Bentley, W. P. Hanson, J. D. Elliot, F. E. Learned, J. W. Smith, F. H. MacMillan, E. M. Kehoe, Geo. W. Williams and A. F. Morrison, all of Chicago, Ill.

INDIANAPOLIS SOUTHERN.—This company has been incorporated in Indiana, with a capital stock of $200,000, to build a railroad from Evansville northeast about 175 miles to Indianapolis, with a coal branch about 75 miles in length. The incorporators are: David M. Parry, W. E. Stevenson, J. M. McGettigan, Chas. E. Barrett, J. H. Wilson, L. P. Norton, F. A. Hetherington, M. W. Carr, Oliver M. Allen, F. Kline, J. E. Kepperley, D. F. Fleener, J. H. Lowes and George Tull, all of Indianapolis.

IOWA CENTRAL.—Tracks are laid from Belmond, Ia., to Corwith, 22 miles, on this extension from Belmond, northwest 28 miles to Algona. (Aug. 4, p. 561.)

KEATING & SMETHPORT.—This company was incorporated in Pennsylvania Aug. 21, with a capital stock of $10,000, to build a railroad not to exceed five miles long, from a point on the Western New York & Pennsylvania, to the borough of Smethport, on the recently consolidated Pittsburgh, Shawmut & Northern. The directors are: C. A. Backer (President), Melrose, Mass.; Robert Osgood, Salem, Mass.; Z. U. Weiss, East Smethport, Pa.; F. D. Gallup and W. D. Gallup, Smethport.

LEHIGH VALLEY.—An officer writes that the company does not contemplate the building of a spur from Lavonia, or other point in New York, to Conesus Lake. (Aug. 11, p. 575.)

LOUISVILLE & NASHVILLE.—Ballasting with slag is in progress between Montgomery, Ala., and Mobile. The section is also to be laid with new rails.

MACON & BIRMINGHAM.—The General Manager writes that there is nothing definite in the matter of changing the line so as to run through the city of Greenville, Ga. Citizens of that place are endeavoring to bring about the change. (Aug. 11, p. 575.)

MINNESOTA & SOUTH DAKOTA.—This company has been incorporated in Minnesota, with a capital stock of $50,000, to build a railroad from Tyler, Minn., northwest 26 miles.

MISCELLANEOUS COMPANIES.—The Bethune-Craney Construction Co. of Kansas City, Mo., has filed articles of incorporation in Iowa. The company was organized in Missouri in 1892 to build railroads, bridges, etc. This incorporation was made to comply with the laws of the State relative to foreign corporations.

MOBILE & WEST ALABAMA.—Citizens of Demopolis, Ala., have appointed a committee, of which John R. Robertson is one, to solicit subscriptions for this proposed line from Mobile north 350 miles via Tuscaloosa to Florence. H. A. Austill of Mobile, Ala., is President. (June 23, p. 461.)

MONONGAHELA & WASHINGTON.—This company has been formed to build a railroad from Monongahela, Pa., west through Washington. J. B. Bott of Monongahela, Pa., is Chief Engineer.

MONONGAHELA & WESTERN.—A charter has been granted to Wm. Oberlin of McKeesport, Pa., and others, to build a railroad from the Monongahela River near Millsboro, to run west five miles to Clarksburg.

NATCHEZ, URANIA & RUSTON.—H. E. Hardtner of Urania, La., President of this company, is reported to have made arrangements for completing his line from Urania, northwest 62 miles via Ruston to Natchez, Miss. He has about five miles of track laid. (June 20, p. 483.)

NORTH BEND & KETTLE CREEK.—The Laurel Branch of about three miles has been completed. (March 31, p. 236.)

NORTHERN PACIFIC.—The building of the proposed extension west from Portage la Prairie, Manitoba, will not be begun, it is understood, until the Railroad Committee of the Privy Council has sanctioned the crossing over the C. P. R. (Aug. 18, p. 589.)

NORTHWEST TERRITORY ROADS.—Thomas W. O'Brien has a franchise for building a line from Dawson to Grand Forks, where the Eldorado empties into the Bonanza, a distance of 15 miles.

A German syndicate gives notice of application to the Canadian Parliament at its next session for authority to build a railroad from Dawson along Bonanza Creek to Dominion Creek.

OMAHA NORTHERN.—This company has been buying right of way during the past few weeks, and is reported to have secured a right of way through Dakota County, Neb., through the Omaha and Winnebago Indian reservations and through Washington County, Neb. The surveys as located by these purchases, would indicate an air line between Sioux City and Omaha, about 92 miles long.

OMAHA, KANSAS CITY & EASTERN.—The Missouri Railroad Commissioners have condemned the roadbed of the O., K. C. & E., and the Omaha & St. Louis, from West Quincy to the Iowa State Line, and the ties over the same section except between Trenton and Pattonsburg. They state that the rails on the curves are badly worn and cannot be operated with reasonable safety. The board has ordered the companies to make necessary repairs.

PEORIA & ST. LOUIS.—Dwight L. Wing of 116 South Sixth St., Springfield, Ill., expects to begin work at once, according to report, on this proposed line from Peoria, Ill., south about 55 miles to Springfield. (June 30, p. 483.)

QUAKERTOWN & EASTERN.—Rails are reported laid to Durham Village on the extension of this line from Quakertown, Pa., northeast 15 miles to Rieglesville. (April 28, p. 305.)

RALEIGH & EASTERN.—This company has been incorporated in North Carolina, with a capital stock of $100,000, to build a railroad from Raleigh northeast about 20 miles through Wakefield and Earpsboro. E. B. Barbee of Raleigh is a stockholder.

RIO GRANDE WESTERN.—The H. & T. Roylance Grading Co. of Springville, Utah, have the contract for building the branch from Schofield, Utah, to Clear Creek coal mines, five miles. (July 21, p. 531.)

ST. LOUIS & SAN FRANCISCO.—Location completed for the extension from Mansfield, Ark., southeast 113 miles via Windfield to Hot Springs. The maximum grade is 1%, and the maximum curvature 3°. Grading will average about 25,000 cu. yds. per mile. There will be three small tunnels.

ST. LOUIS, COLLINSVILLE & EASTERN.—This company has been incorporated in Illinois, with a capital stock of $350,000, to build a railroad from East St. Louis east to Collinsville, with a branch from Collinsville to Venice and thence to East St. Louis. The incorporators are: W. S. Forman, D. M. Browning, S. D. Sexton and M. M. Stephens of East St. Louis; C. N. Travous, W. M. Warnock and W. G. Burroughs of Edwardsville.

SEATTLE & SAN FRANCISCO.—The Northern Pacific has joined this company in building the section of the S. & S. F. line from Palmer, Wash., through coal property to Auburn, and the line will be operated jointly by the two companies under a perpetual traffic agreement. The line as projected is from Palmer northeast about 30 miles to a point on Puget Sound near Seattle. W. E. Guerin of Seattle, is President. (July 21, p. 531.)

SOUTHEASTERN OF YUCATAN.—A farewell dinner was given on the evening of Aug. 17 at the Waldorf-Astoria, New York, by Señor Peon y Loza of Yucatan, Mexico, to his New York associates and friends connected with this company. The line is being surveyed and active building will be begun soon. The rolling stock and machine shop equipment will be ordered in this country. Among those interested are Henry P. Booth, President of the Ward Line of steamers; G. Martin Brill, President of the J. G. Brill Co., Philadelphia; Walter D. Munson, President of the Munson Line of Steamers; Felipe G. Canton, merchant of Yucatan and New York, and James M. Motley, Vice-President of the Thornton N. Motley Co. Mr. Motley is Secretary of the New York Committee. The line will be over 400 miles long and the shops will be equipped with the latest and most improved tools of American manufacture. Señor Peon is one of the largest hemp producers in the world, besides being a very large exporter of dye and logwoods to Russia and the Continent. This company has been heretofore referred to in this column as the National Yucatan Southeastern. (Aug. 11, p. 575.)

SOUTHERN.—An officer writes that it has not been determined to make the extension in Florence, Ala., to the site of a new proposed station. The grades would be heavy and the curves sharp and little, if anything, would be gained by building.

The spur to the new cotton mill at West Point, Miss., is to be built by the regular forces of the company. It will be practically a siding and only about 2,000 ft. long. (Aug. 18, p. 589.)

SOUTHFIELD BEACH.—This company was incorporated in New York Aug. 18, to build a railroad two miles long in Richmond County. The incorporators are: Albert Reynaud and Geo. Bringolf, New Dorp, S. I., N. Y.; Wm. J. Quinlan, Port Richmond, N. Y.; Ernest G. Wightman and John B. Newhall, Stapleton, N. Y.; Geo. P. Reynaud, Mt. Vernon, N. Y.; Geo. N. Frecker, 81 Fulton St., New York City, Wm. D. Stratton, 100 Broadway, New York; Robert W. Pollock, Atlanta, Ga.

SOUTHERN PACIFIC.—The Texas & New Orleans proposes to build an extension from Rockland, Tex., the present northern terminus of the Sabine Division in Tyler County, to run northwest about 170 miles to Cedar, the southern terminus of the Texas Trunk in Kaufman County. The route between these two points is not yet definitely decided. Surveys are to be begun Sept. 1 on the section from Rockland northwest about 25 miles to Lufkin in Angelina County. It is also decided to build the section from Cedar southeast 25 miles to Athens in Henderson County on the St. Louis Southwestern. Preliminary surveys have been made for this section and final location is now in progress. It is expected the contract for grading and track laying between Cedar and Athens will be let Oct. 1. The line will run through a hilly broken country. The maximum grade will be 1%, and the maximum curvature 4 deg. It is expected that the grading will average about 25,000 cu. yds. per mile. (Official.)

TAMA CITY, MONTEZUMA & OTTUMWA.—This company is being organized in Iowa to build a railroad from Tama City, on the main line of the Chicago & Northwestern and the Chicago, Milwaukee & St. Paul, to run south about 80 miles, via Montezuma, to Ottumwa, on the main line of the Chicago, Burlington & Quincy and the Keokuk branch of the Chicago, Rock Island & Pacific.

WESTERN MARYLAND.—Grading is in progress on the cut-off between Quinsonia, Pa., and New Franklin, four miles. Wade, Burns & Co., of Baltimore, have the contract. (Aug. 4, p. 561.)

WISCONSIN, MICHIGAN & NORTHERN.—Work has been suspended on the extension from Faithorn Junction, Wis., north 16 miles to Quinnesse, due, it is said, to the scarcity of labor. (June 2, p. 394.)

GENERAL RAILROAD NEWS.

BALTIMORE & OHIO SOUTHWESTERN.—The new company has filed a mortgage for $45,000,000 to the Farmers Loan & Trust Co., and W. H. H. Miller, as trustees. This will secure an issue of 3½% bonds under the reorganization. (Aug. 4, p. 562.)

BOSTON & ALBANY.—The committee of seven from the Boston Chamber of Commerce, of which Samuel B. Capen is Chairman, has issued a report favoring the lease of the B. & A. to the New York Central & Hudson River Co. The committee holds that a union of the two roads would be of great benefit to the commercial interests of Boston and the State through increased terminal facilities and growth in traffic as an inevitable result. The committee does not believe that there is a risk that the property may be returned in a depreciated condition, and that the safeguards of the State law will prevent increased indebtedness. The opinion is expressed that it is not reasonable to expect over 8 per cent. as a maximum dividend to be realized on Massachusetts roads in the future. (Aug. 18, p. 589.)

CAROLINA & NORTHWESTERN.—Officers of the Seaboard Air Line deny that that company has bought the Carolina & Northwestern, as recently reported. (Aug. 4, p. 562.)

CHESAPEAKE & OHIO.—The directors have declared the first dividend of one per cent. on its common stock, payable Oct. 25. This will leave a credit balance of $99,866 over the receipts of the year ended June 30, 1899.

The New York Stock Exchange has listed $2,000,000 additional general mortgage 4½% bonds of 1992, of which $1,500,000 will be used as follows: To build a second grain elevator, an additional ocean pier and an additional coal pier at Newport News, Va. (Aug. 11, p. 575.); branch of about 18 miles long to develop additional coal territory in West Virginia, an elevated viaduct at Richmond; also ocean tugs and bridges for coal transportation. The remaining $500,000 will be used for second tracking now in progress, but not to exceed an average of $25,000 per mile. The double tracking is mostly to complete that between Clifton Forge and Hinton.

CLEVELAND, CANTON & SOUTHERN.—This property was turned over to the Wheeling & Lake Erie Co. on Aug. 14. (Aug. 18, p. 590.)

COLUMBUS, HOCKING VALLEY & TOLEDO.—Car trust bonds, series A, to the amount of $45,000, have been drawn for redemption at par and accrued interest on Oct. 1, at the Atlantic Trust Co., New York. May 26, p. 380.)

FLINT & PERE MARQUETTE.—The principal and interest of $104,000 Port Huron & Northwestern first mortgage 7% bonds, maturing Oct. 1, will be paid when due by Fahnestock & Co., 2 Wall St., New York. (June 23, p. 462.)

GEORGIA.—The Atlantic Coast Line has secured a half interest in the lease of this property, now controlled by the Louisville & Nashville.

GREAT EASTERN.—This line of the Atlantic & Lake Superior, running from St. Gregoire, Que., on the Grand Trunk, southwest about 28 miles to Yamaska, is to be sold by the sheriff of Richelieu at Sorel on Aug. 29, at 11 a. m. This sale is at the instance of Mayor Prefontaine and C. N. Armstrong, as the result of their suit against the company. Only about seven miles of the line is completed.

KANSAS CITY, PITTSBURGH & GULF.—The committee of which Wm. F. Harrity is Chairman, has announced a plan of reorganization, calling for the formation of a new company which shall acquire the property of the existing K. C., P. & G., a majority at least of the stocks of the Kansas City Suburban Belt, and the Port Arthur Channel & Dock Co. The new company will issue first mortgage 50-year 4% gold bonds to the value of $30,000,000, of which $18,000,000 will be for the conversion of existing first mortgage bonds at the rate of $750 in new bonds for $1,000 in the old bonds; $3,000,000 will be sold for cash requirements of the new company. These have been underwritten at 85%. The remaining $9,000,000 is reserved for future requirements. There will be issued $20,000,000 of 4% noncumulative preferred stock, which, with the common stock, is to be in voting trust for five years. Of this amount, $9,600,000 will be exchanged for present mortgage bonds at the rate of $400 new preferred stock for each $1,000 bond; $3,362,500 for acquiring the capital stock of the Kansas City Suburban Belt at 75% of new stock for each share of the old; $2,400,000 for a payment of $10 per share on old K. C., P. & G. stock, and the remaining $4,437,500 is reserved for future requirements. Of common stock, there will be issued $30,000,000, of which $24,000,000 will be exchanged at par for the old stock; $1,187,500 for buying the Kansas City Suburban Belt at 25%, and the balance, $4,812,500, for future requirements. Under this arrangement the first mortgage 5% bonds will receive on each $1,000, $750 of new bonds and $400 of new preferred stock. The stockholders who pay $10 assessments per share will receive $10 in new preferred stock, and $100 in common stock. The Kansas City Suburban Belt stock will receive 75% in preferred, and 25% in common stock. An issue of 3½% terminal bonds will be made to retire the bonds secured upon the terminal properties. Holders of certificates of deposit are required to present the same on or before Sept. 20. (Aug. 4, p. 562.)

KICKAPOO VALLEY & NORTHERN.—This company's property is to be sold at public auction Sept. 30 at Madison, Wis. It has been in the hands of receivers since March 3, 1894.

LEBANON SPRINGS.—This property was sold at public auction at Troy, N. Y., Aug. 12, to W. C. Roberts of New York. It has been in the hands of receivers since 1888. (Aug. 11, p. 576.)

NASHVILLE, FLORENCE & SHEFFIELD.—The Louisville & Nashville, on Aug. 16, filed a bill in equity in the United States Circuit Court at Nashville, Tenn., against this road, seeking to sell it to satisfy a judgment for $873,680.87 and $26 costs which was secured at the last term of court. The N., F. & S. is controlled by the L. & N. through ownership of stock.

NORTHERN PACIFIC.—E. H. Harrimon is quoted as saying that there has been no actual move toward an agreement between the Northen Pacific and the Oregon Railroad & Navigation Co. with reference to the Clearwater situation, except for an absolute rest for six months. (July 21, p. 532.)

PITTSBURGH, SHAMUT & NORTHERN.—Henry Marquand & Co. are offering a limited amount of the new $12,000,000 first mortgage gold bonds at 101 and interest. This is the company recently incorporated to absorb the Buffalo, St. Marys & Southwestern, the Central New York & Western, and other roads. (Aug. 11, p. 576.)

ST. LOUIS, INDIANAPOLIS & EASTERN.—This property has been sold at public auction to the Illinois Central for $1,000,000. It was transferred to the Illinois Central March 25, but under the ruling of the United States Circuit Court, a new decree of foreclosure was ordered. (June 30, p. 484.)

SALISBURY & HARVEY.—An order has been made in the Equity courts for the foreclosure sale of this property which has been for some time in the hands of receivers. The bondholders and the stockholders are for the most part the same, and it is probable that the present bondholders will bid in the property. (Sept. 3, 1898, p. 698.)

TEXAS & NEW ORLEANS.—A meeting of the stockholders has been called for Sept. 20 to authorize an amendment of the charter so that the company may own the Sabine & East Texas and the Texas Trunk, and to authorize the purchase of these roads. (Southern Pacific, May 26, p. 380.)

WEST VIRGINIA & PITTSBURGH.—Announcement is made that this property is to be taken over by the Baltimore & Ohio, under a 999 year lease, for operation on and after Sept. 1. (April 28, p. 308.)

TRAFFIC.

Traffic Notes.

The Journal of Commerce, New York, reports that heavy grain dealers of New York City have made long time contracts with certain railroads between Buffalo and New York—it is hinted that they are the New York Central and the Lehigh Valley—for carrying Lake wheat to the seaboard at 2¾ cents a bushel and corn at 2¼ cents; and that as the tariff rates have now been raised to prices higher than these, the large dealers are sub-letting "room" to small dealers.

The Texas Anti-Rebate Law.

All of the Texas railroad officials have been furnished by their respective attorneys with opinions construing the Texas anti-rebate law, which becomes effective August 26, and which makes the giving of rebates a felony. The opinions are the result of a conference held by the attorneys in Dallas about a week ago. Thus far no reporter has been permitted to see a copy of the opinions, but from several sources within railroad circles it is learned that they are very far-reaching. The railroad lawyers hold that the law applies to both interstate and intrastate traffic, and no shipper or receiver of freight can get a pass under any consideration whatsoever, as it would be considered a rebate. For the same reason any courtesies that may have been extended heretofore by stretching baggage, storage and demurrage rules will be withdrawn, and all shippers are to be accorded like treatment. There is one question that has not yet been finally determined and that relates to the matter of switching charges. Whether or not the absorption of a switching charge for a shipper, whose place of business is off the line of the delivering railroad, is a rebate is still to be considered.—Galveston News.

Chicago Traffic Matters.

Chicago, Aug. 23, 1899.

All of the stronger railroad systems centering at Kansas City have cut off pro rating and through billing arrangements with the Kansas City, Pittsburgh & Gulf. After trying to induce the receivers of this line to advance their rates from North Atlantic seacoast points to Southwestern territory, the roads reaching into the latter district from Chicago and St. Louis came to the conclusion that further negotiations with this object in view would be useless. The Santa Fe came out flat-footed with orders severing all pro rating and traffic relations with the Gulf; the Milwaukee & St. Paul will interchange no business with it and the Missouri Pacific gave notice of its intention by refusing to deliver traffic to the Gulf. The receivers of the latter allege that their system has been boycotted, and that it will seek redress in the Federal courts by asking for an injunction restraining its connection from refusing to accept traffic from the Gulf or declining to deliver shipments to it.

An indication of the way freight traffic has gone to South Chicago and the Calumet harbor district is a notice from the local freight officers of the Lake Shore road that by reason of the misleading character of the weekly Board of Trade statements of eastbound tonnage from Chicago they will not longer compile these statements for weekly publication. As readers of the Railroad Gazette know, there have been two statements of eastbound shipments issued from this city every week. One is from figures furnished by the Board of Trade and the other comes from the Chairman of the Chicago east bound freight committee. The first named gave the shipments of all classes of freight from Chicago proper, or the old district within a radius of about four or five miles of the City Hall, and did not include the immense interchange traffic at any of the numerous Outer Belt Line crossings nor of the Calumet and South Chicago districts. The freight committee's statement does cover all junctions in Cook County, but gives only the shipments that are destined to and beyond the western termini of the trunk lines. During the past two or three years the bulk of the heavy interchange, or car-load business, has drifted to the Calumet and the Outer Belt junctions. In fact, at present there is very little car-load interchange business in the inner or old Chicago district. The deep harbor at South Chicago, the solid way in which the city has been built up around the inner yards, and the track elevation, making transfers long and inconvenient, and the increase in switching charges, are a few of the causes of the change in conditions. Officers of the Lake Shore say that the bulk of their business is now from the Calumet harbor district and that as the Board of Trade statement that does not include that territory, it does their road an injustice by giving only the smaller part of their business. The Chicago committee's statement will now be the only one showing eastbound shipments from this city, and even this is misleading for the reason that it does not give all the traffic moved east from here but only that part of the total that goes to or beyond Buffalo, Pittsburgh, Wheeling, etc.

When a ticket scalper becomes lost for a scheme to beat the railroads others need think no further. A local broker last week extensively advertised cheap rates to Niagara Falls. A little investigation found that he was selling local tickets from Chicago to Knox, Ind., the eastern terminus of the Indiana, Illinois & Iowa road, and its junction with the Nickel Plate. The ticket buyers were given orders on the Three I's agent at Knox to sell the bearers round trip tickets to Niagara Falls on an excursion that was run on the date the tickets were sold. By an agreement none of these cheap Niagara Falls excursions are run from the Chicago territory and the scalper's scheme was to break through the barricade. Officers of competing roads charge the Nickel Plate with being in the deal, but officers of the latter say that they knew nothing about it until the details of the trick were printed.

The Chicago & Alton, Illinois Central and the Wheeling & Lake Erie roads have applied for membership in the Central Traffic Association's mileage bureau.

Officers of roads in the Western Passenger Association are considering the question of refusing to check baggage on any ticket the purchase price of which is less than 50 cents.

Eastern roads have refused to participate in the 15-cent rate on export flour recently announced by the Santa Fe and Rock Island lines from the Missouri River to New York.